Powering Business Worldwide

ATC-300/800 Contactor Open/Closed Transition Bypass Isolation Transfer Switch

Instruction Booklet

⚠ WARNING

READ AND UNDERSTAND THE INSTRUCTIONS CONTAINED HEREINAFTER BEFORE ATTEMPTING TO UNPACK, ASSEMBLE, OPERATE, OR MAINTAIN THIS EQUIPMENT.

WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E, OSHA AND OTHER APPLICABLE REQUIREMENTS PERTAINING TO OPERATOR SAFETY PRIOR TO SERVICING EQUIPMENT. ALL WORK ASSOCIATED WITH SUCH ELECTRICAL EQUIPMENT SHOULD BE PERFORMED ONLY BY A QUALIFIED/COMPETENT PERSON AS DEFINED BY APPLICABLE REGULATION WHO SHOULD ALSO FOLLOW ALL APPLICABLE PROTECTIVE CLOTHING SYSTEM REQUIREMENTS AND REVIEW APPROPRIATE HAZARD ASSESSMENT AND ENERGY CONTROL PRECAUTIONS AND PROCEDURES. FAILURE TO FOLLOW THIS WARNING COULD LEAD TO DEATH OR SEVERE INJURY.

TRANSFER SWITCH EQUIPMENT COVERED BY THIS INSTRUCTION BOOK IS DESIGNED AND TESTED TO OPERATE WITHIN ITS NAMEPLATE RATINGS. OPERATION OUTSIDE OF THESE RATINGS MAY CAUSE THE EQUIPMENT TO FAIL RESULTING IN DEATH, SERIOUS BODILY INJURY, AND/OR PROPERTY DAMAGE. ALL RESPONSIBLE PERSONNEL SHOULD LOCATE THE DOOR MOUNTED EQUIPMENT NAMEPLATE AND BE FAMILIAR WITH THE INFORMATION PROVIDED ON THE NAMEPLATE. A TYPICAL EQUIPMENT NAMEPLATE IS SHOWN IN FIGURE 1.

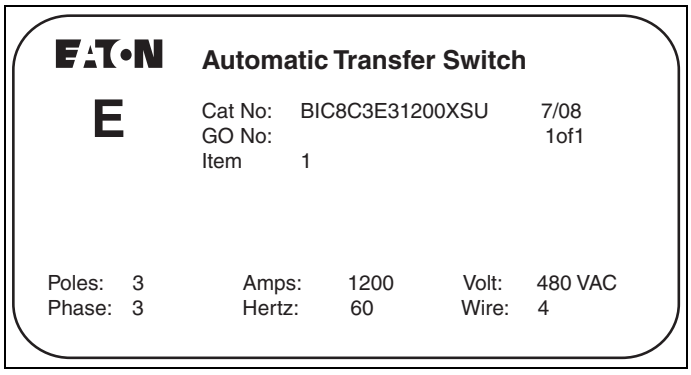

Figure 1. Typical Automatic Transfer Switch Equipment Nameplate.

NOTICE

A FINAL INSPECTION OF THE EQUIPMENT SHOULD BE PERFORMED PRIOR TO ENERGIZING THE TRANSFER SWITCH.

Step 1: Remove any dirt or debris that may have collected during shipment or installation. NEVER use high pressure blowing air. This could drive dirt or other foreign objects into electrical or mechanical components which could cause damage. Use an industrial quality vacuum cleaner to remove any dirt or foreign objects.

Step 2: Be certain all cable connections are correct and that the phase rotation of both sources match.

Step 3: Inspect the engine start connections and verify the correct connection of all control wires.

Step 4: Check all programmable setpoints and adjust as necessary. In addition, adjust any optional accessories as required.

Step 5: Be certain that the actual lug torque values are in keeping with the requirements outlined in this instruction book to insure the integrity of power connections.

Step 6: Check to be sure that all covers and barriers are properly installed and fastened.

ALL POSSIBLE CONTINGENCIES WHICH MAY ARISE DURING INSTALLATION, OPERATION, OR MAINTENANCE, AND ALL DETAILS AND VARIATIONS OF THIS EQUIPMENT DO NOT PURPORT TO BE COVERED BY THESE INSTRUCTIONS. IF FURTHER INFORMATION IS DESIRED BY THE PURCHASER REGARDING HIS PARTICULAR INSTALLATION, OPERATION, OR MAINTENANCE OF PARTICULAR EQUIPMENT, CONTACT AN EATON REPRESENTATIVE.

Section 1: Introduction

1.1 Preliminary Comments and Safety Precautions

This technical document is intended to cover most aspects associated with the installation, application, operation, and maintenance of ATC-300/800 controlled contactor based transfer switch equipment with ratings from 100 through 1200 amperes (A). It is provided as a guide for authorized and qualified personnel only. Please refer to the specific WARNING and CAUTION in Section 1.1.2 before proceeding. If further information is required by the purchaser regarding a particular installation, application, or maintenance activity, contact an Eaton representative. For information associated with the control, refer to the separate instruction book pertaining to the logic package installed in the switch.

1.1.1 Warranty and Liability Information

No warranties, expressed or implied, including warranties of fitness for a particular purpose of merchant-ability, or warranties arising from course of dealing or usage of trade, are made regarding the information, recommendations and descriptions contained herein. In no event will Eaton be responsible to the purchaser or user in contract, in tort (including negligence), strict liability or otherwise for any special, indirect, incidental or consequential damage or loss whatsoever, including but not limited to damage or loss of use of equipment, plant or power system, cost of capital, loss of power, additional expenses in the use of existing power facilities, or claims against the purchaser or user by its customers resulting from the use of the information and descriptions contained herein.

1.1.2 Safety Precautions

All safety codes, safety standards, and/or regulations must be strictly observed in the installation, operation, and maintenance of this device.

⚠ WARNING

THE WARNINGS AND CAUTIONS INCLUDED AS PART OF THE PROCEDURAL STEPS IN THIS DOCUMENT ARE FOR PERSONNEL SAFETY AND PROTECTION OF EQUIPMENT FROM DAMAGE. AN EXAMPLE OF A TYPICAL WARNING LABEL HEADING IS SHOWN ABOVE TO FAMILIARIZE PERSONNEL WITH THE STYLE OF PRESENTATION. THIS WILL HELP TO INSURE THAT PERSONNEL ARE ALERT TO WARNINGS, WHICH APPEAR THROUGHOUT THE DOCUMENT. IN ADDITION, CAUTIONS ARE ALL UPPER CASE AND BOLDFACE.

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⚠ CAUTION

DO NOT ATTEMPT TO SERVICE OR PERFORM MAINTENANCE ON EQUIPMENT WHILE IT IS ENERGIZED. FAILURE TO FOLLOW THIS WARNING COULD LEAD TO DEATH OR SEVERE INJURY. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT ON EQUIPMENT PRIOR TO SERVICING. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO OPERATING, INSPECTING OR SERVICING EQUIPMENT.

⚠ WARNING

THE CLOSED TRANSITION PRODUCT CONTAINS A SPECIAL CONTACT ARRANGEMENT (OVERLAPPING CONTACTS). MISUSE CAN RESULT IN DEATH, SEVERE PERSONAL INJURY, AND/OR PROPERTY DAMAGE.

1.2 General Information

Transfer switches are used to protect critical electrical loads against loss of power. The Source 1 power source of the load is backed-up by a Source 2 power source. A transfer switch is connected to both the Source 1 and Source 2 power sources and supplies the load with power from one of these two sources. In the event that power is lost from the Source 1 power source, the transfer switch transfers the load to the Source 2 power source. This transfer can be automatic or manual, depending upon the type of transfer switch equipment being used. Once Source 1 power is restored, the load is automatically or manually transferred back to the Source 1 power source, again depending upon the type of transfer equipment being used (Figure 2).

In addition, the closed transition feature may be applied where it is desirable to avoid any momentary power interruptions. Although the closed transition switch is not a substitute for an uninteruptable power source (UPS), it does eliminate power interruptions to loads except to those caused by power sources or equipment external to the transfer switch. If both sources are acceptable as determined by the ATC-800 controller. A make-before-break transfer is performed during a transfer test or retransfer operation using the bypass contactor momentarily.

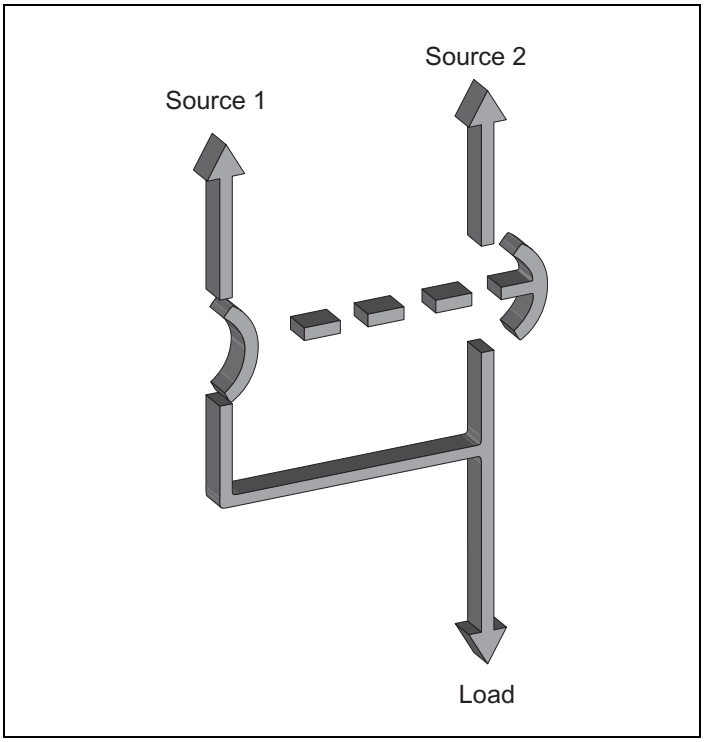

Figure 2. Typical Load Transfer Switch (Switching Device Type) Schematic. One Three Position, Closed on Source 1, Contactor Shown.

1.2.1 Transfer Switch Types

Open/closed transition bypass isolation type automatic transfer switches consist of four basic elements.

1. Main contacts to connect and disconnect the load to and from the source of power.
2. Intelligence/supervisory circuits to constantly monitor the condition of the power sources and thus provide the intelligence necessary for the switch and related circuit operation.
3. A transfer mechanism to effect the transfer of the main contacts from source to source.
4. Voltage selection, bypass selection, and transformer panel.

The Bypass Isolation Switch shown in Figure 3 is designed for applications where maintenance, inspection, and testing must be performed while maintaining continuous power to the load. This is typically required in critical life support systems and standby power situations calling for safe system maintenance with no power disruptions. Such a design allows for the quick removal of the ATS switching devices for inspection, maintenance, or replacement.

1.2.2 Design Configuration

The Eaton transfer switch is a rugged, compact design utilizing power contactors to transfer essential loads from one power source to another. Open transition switching devices are interlocked to prevent both switching devices from being closed at the same time.

The switching devices are in a compact vertical arrangement. The logic can be easily disconnected from the switching device without disturbing critical connections. The enclosure is free standing, and is seismic approved. The terminals are mounted in the rear of the switch for front access, permitting rear, top, bottom, or side cable entrance. The terminals also can be mounted on the top or bottom or any assortment of that.

The switching devices have a high withstand rating (Table 1). Figure 4 shows the schematic of the Bypass Isolation Switch. There are two contactors that enable the transfer as a bypass in an open or closed transition. The unit can also be operated as a redundant switch with the controller being full activated with the primary (ATS) or redundant (Bypass) switch.

Figure 3.Typical Bypass Isolation Switch.

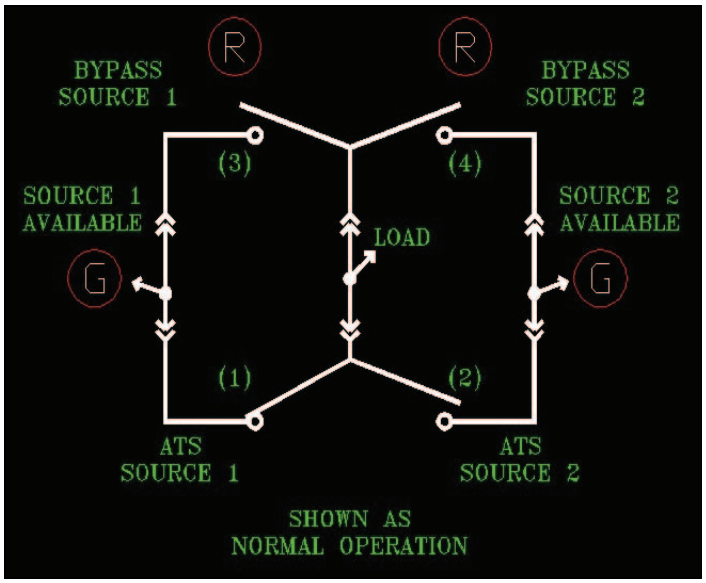

Figure 4. Typical Bypass Isolation Switch Schematic.

Table 1. Withstand Ratings.

UL 1008 WITHSTAND AND CLOSE-ON RATINGS (KA)	480 VOLTS	480 VOLTS	600 VOLTS	600 VOLTS
	Any Breaker	Specific Breaker	Any Breaker	Specific Breaker
100	50,000	65,000	42,000	65,000
200	50,000	65,000	42,000	65,000
260	50,000	65,000	42,000	65,000
320	50,000	65,000	42,000	65,000
400	50,000	65,000	42,000	65,000
600	50,000	65,000	42,000	65,000
800	50,000	65,000	42,000	65,000
1000	50,000	65,000	42,000	65,000
1200	50,000	65,000	42,000	65,000

Tested in accordance with UL1008.

Eaton transfer switch will coordinate with a power switching device short time rating. Contact factory for details.

1.3 Draw-out Switching Devices

All switching devices are 100% rated, Underwriters Laboratories (UL) 1008 listed, and are built and tested in an ISO 9002 certified facility to applicable NEMA, ANSI, IEEE, and UL standards.

The main difference between the ATS and the Bypass versions of the switching devices (contactors) used in the bypass isolation transfer switch is the interlock mounting methods. Figure 5 shows the two contactors in the switch. The bottom is the ATS contactor and the top is the bypass contactor. The ATS contactor will do nearly all of the current transfer for the loads during the life of the switch. The ATS switching device is mounted with safety interlocks, in a "truck" mechanism, allowing the switching device to be “drawn-out” for service, maintenance, and/or replacement. The Bypass device can also be drawn-out but utility and generator power must be removed from the switch.

Figure 5. Switching Devices Installed in the Transfer Switch.

1.3.2 Draw-out Switching Devices

The ATS draw-out switching device is a design having three positions with the compartment door closed (CONNECT, TEST, DISCONNECT). Figure 6 shows the contactor fully disconnected from the transfer switch. It is ready for removal. The ATS draw-out switching device is equipped with both primary and secondary disconnects to provide for the draw-out functioning. The primary contacts (Figure 7) are the S1, S2, and load contacts. The secondary contacts are the control and feedback contacts. The secondary connector is on the side of the truck and is somewhat floating for easy racking-in. The operating mechanism is electrically operated and also has a mechanical operation if required in an emergency. When withdrawn, the ATS switching device can be inspected, tested, and minor maintenance performed. The inside of the compartment can also be inspected with the ATS switching device withdrawn. Caution must be taken as there is voltage on the run-backs (copper) in the back of the cell once the contactor is removed.

⚠ WARNING

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Figure 6. Draw-out Switching Device Fully Extended from the Transfer Switch's Runbacks.

Figure 7. Primary Connections on the Switching Device, Four Pole Shown.

1.4 Transfer Switch Catalog Number Identification

Transfer switch equipment catalog numbers provide a significant amount of relevant information that pertains to a particular piece of equipment. The catalog number identification table (Table 2) provides the required interpretation information. An example for an open transition switch is offered to initially simplify the process.

Example: Catalog Number (circled numbers correspond to position headings in Table 2).

①to②	③	④	⑤ to ⑥	⑦	⑧	⑨to⑫	⑬	⑭	⑮
BI	C	8	C3	E	3	0800	X	S	U

The catalog number BIC8C3E31200XSU describes a bypass isolation transfer switch with the switching devices mounted vertically in the enclosure. The intelligence, represented by the ATC-800 is a microprocessor-based logic package. The contactor is used as the switching device and is a 3-pole for each source. The continuous current rating of this equipment is 800A and is applicable at 480 Vac, 60 Hz. The transfer switch equipment is enclosed in a NEMA 1 enclosure and is listed for Underwriters Laboratories (UL) and Canadian Standards Association (CSA) applications.

Table 2. Transfer Switch Catalog Number Explanation.

BI C 8 C3 E 3 0800 X S U

Type
- **BI** = Bypass Isolation Open Transition
- **CB** = Bypass Isolation Closed Transition

Orientation
- **C** = Contactor

Logic
- **3** = ATC-300
- **8** = ATC-800

Mechanism
- **C3** = 3 Position

Switch
- **E** = Drawout

Number of Poles
- **2** = 2 pole
- **3** = 3 pole
- **4** = 4 pole

Amperes
- **0040** = 40A
- **0080** = 80A
- **0100** = 100A
- **0150** = 150A
- **0200** = 200A
- **0225** = 225A
- **0260** = 260A
- **0400** = 400A
- **0600** = 600A
- **0800** = 800A
- **1000** = 1000A
- **1200** = 1200A

Voltage
- **A** = 120V, 60Hz
- **B** = 208V, 60Hz
- **E** = 600V, 60Hz
- **G** = 220V, 50Hz
- **H** = 380V, 50Hz
- **K** = 600V, 50Hz
- **M** = 230V, 50Hz
- **N** = 401V, 50Hz
- **O** = 415V, 50Hz
- **W** = 240V, 60Hz
- **X** = 480V, 60Hz
- **Z** = 365V, 50Hz

Enclosure
- **K** = Open
- **S** = NEMA 1
- **J** = NEMA 12
- **R** = NEMA 3R

Certification
- **U** = UL Listed
- **R** = UL Recognized

1.5 Environmental Conditions

1.5.1 Operational Conditions

Normally, an ATS is applied indoors in an electrical equipment room. In the appropriate enclosure, it can be used for outdoor applications where the equipment is subject to falling rain, freezing temperatures, and no greater than 90% humidity (non-condensing). The ambient temperature range for operation is between -20 and 70°C (-4 to 158°F). A heater may be required.

1.6 Glossary

With respect to their use within this document and as they relate to transfer switch and controller operation, the following terminology is defined.

Available
A source is defined as "available" when it is within its undervoltage/overvoltage/ underfrequency/overfrequency (if applicable) setpoint ranges for the nominal voltage and frequency setting.

Bypass
To transfer to another contactor, same source, with no power interruption. The bypass unit now becomes the automatic switching device.

Connected
Connected is defined as when the input is shorted by an external contact or connection.

Failed or Fails
A source is defined as "failed" when it is outside of the applicable voltage and frequency setpoint ranges for the nominal voltage and frequency setting for a time exceeding 0.5 seconds after the time delay emergency fail (TDEF) time delays expires.

Failsafe
Failsafe is a feature that prevents disconnection from the only available power source and also forces a transfer or re-transfer operation to the only available power source.

Re-Transfer
Re-transfer is defined as a change of the load connection from the Source 2 to the Source 1.

Source 1
Source 1 is the primary source (normal source, normal power source, or normal).

Source 2
Source 2 is the secondary source (emergency source, emergency power source, emergency, standby, or backup source).

Source 1: Failed or Fails
Source 1 is defined as "failed" when it is outside of its undervoltage/overvoltage/ underfrequency/overfrequency (if applicable) setpoint ranges for the nominal voltage and frequency setting.

Source 2: Failed or Fails
Source 2 is defined as "failed" when it is outside of its undervoltage/overvoltage/ underfrequency/overfrequency (if applicable) setpoint ranges for the nominal voltage and frequency setting for a time exceeding 0.5 seconds after the Time Delay Emergency Fail (TDEF) time delay expires.

Transfer
Transfer is defined as a change of the load connection from the Source 1 to the Source 2 power source.

Trip
Device is not connected to Source 1/ or Source 2.
Device is open.

Unconnected
Unconnected is defined as when the input is not shorted by an external contact or connection.

Section 2: Receiving, Handling, and Storage

2.1 Receiving

Every effort is made to ensure that the transfer switch equipment arrives at its destination undamaged and ready for installation. Crating and packing is designed to protect internal components as well as the enclosure. Transfer switch enclosures are skid mounted and suited for fork lift movement. Care should be exercised, however, to protect the equipment from impact at all times. Do not remove the protective packaging until the equipment is at the installation location and ready for installation.

When the transfer switch equipment reaches its destination, the customer should inspect the shipping container for any obvious signs of rough handling and/or external damage incurred during transportation. Record any external and internal damage observed for reporting to the transportation carrier and Eaton, once a thorough inspection is completed. All claims should be as specific as possible and include the Shop Order and General Order numbers.

A shipping label which includes a variety of equipment and customer information, such as General Order Number (GO #) and Catalog Number (Cat #) is affixed to the top of the shipping container. Make certain that this information matches other shipping paper information.

Each transfer switch enclosure is bolted to a rigid wooden pallet. The pallet is open at two ends for movement by a fork lift. The shipment is secured and further protected with shrink wrap. Do not discard the packing material until the equipment is ready for installation.

A plastic bag of documents will be found within the enclosure, usually attached to the inside of the door. Important documents, such as test reports, wiring diagrams, and appropriate instruction leaflets, are enclosed within the bag and should be filed in a safe place. There are also keys for the unit.

2.2 Handling

As previously mentioned, the transfer switch equipment is packaged for fork lift movement. Protect the equipment from impact at all times and DO NOT double stack. Once the equipment is at the installation location and ready for installation, the packaging material can be removed. Once the enclosure is unbolted from the wooden pallet, it can be installed using the lifting provision located on the top of the structure. Be careful not to damage the top or bottom enclosure mounting flanges. Refer to Section 4 of this manual for specific installation instructions.

2.3 Storage

Although well packaged, this equipment is not suitable for storage outdoors. The equipment warranty will not be applicable if there is evidence of outdoor storage. If the equipment is to be stored indoors for any period of time, it should be stored with its protective packaging material in place. Protect the equipment at all times from excessive moisture, construction dirt, corrosive conditions, and other contaminants.

It is strongly suggested that the package-protected equipment be stored in a climate controlled environment of -20° to 85°C (-4° to 185°F) with a relative humidity of 80% or less. DO NOT, under any circumstances, stack other equipment on top of a transfer switch equipment enclosure, whether packaged or not.

Section 3: Equipment Description

3.1 General

The ATS consists of:

1. The power panel ; consisting of the contactors inserted in the trucks;
2. The voltage selection and transformer pack;
3. The bypass logic panel;
4. The relay panel;
5. The door including the ATC controller; and
6. The bus kits.

The panels are interconnected via connector plugs and mounted in an enclosure (Figure 8).

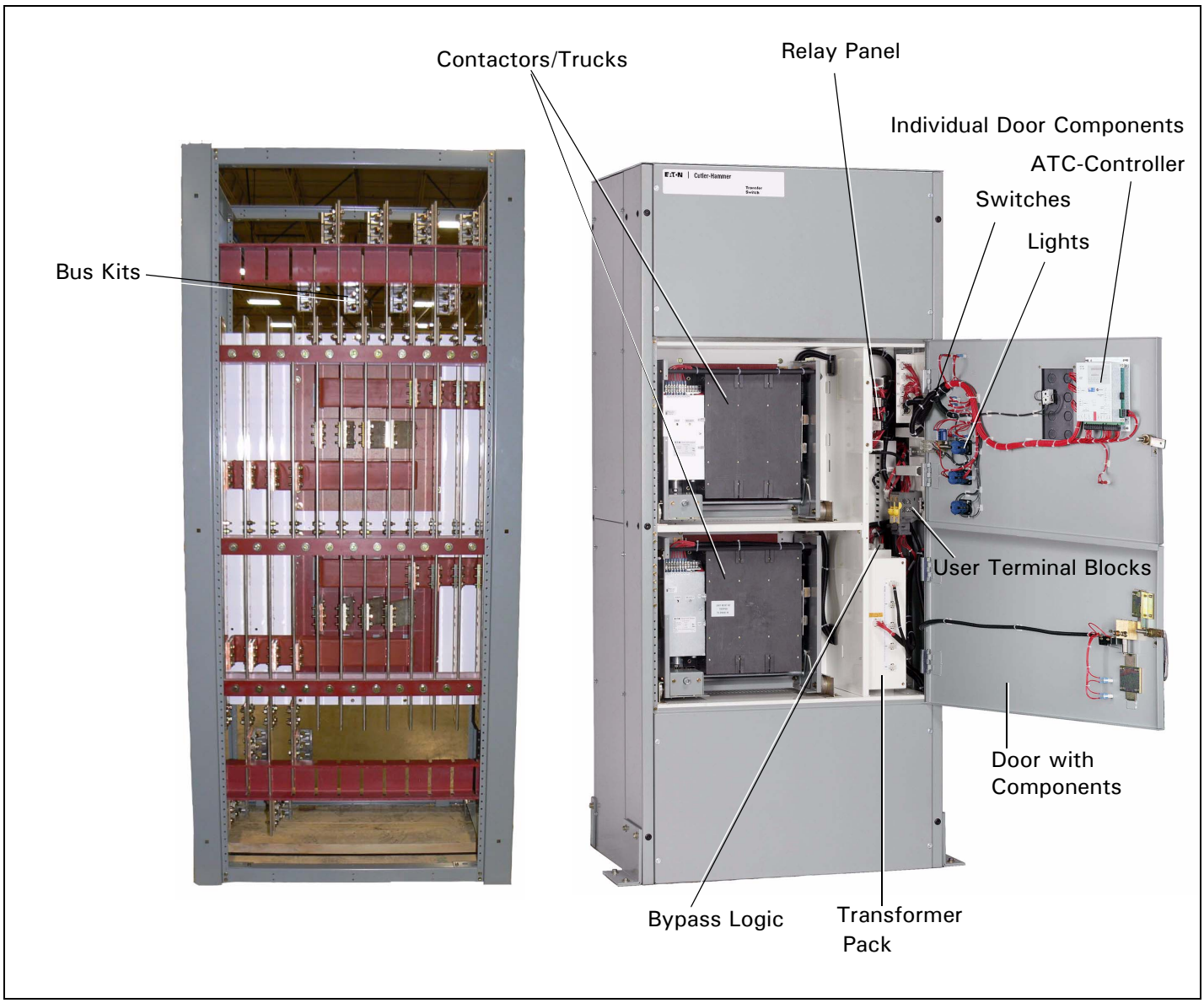

Figure 8. Basic Panels of the Bypass Isolation Switch.

3.2 Power Panel

The power panel consists of a means for making load, power, and neutral connections. The main contacts and the transfer mechanism are all on one steel frame (see Figure 9) called a "truck." The actual power connections are shown in Figure 10.

Figure 9. Front Power Panel (4 Pole Contactor).

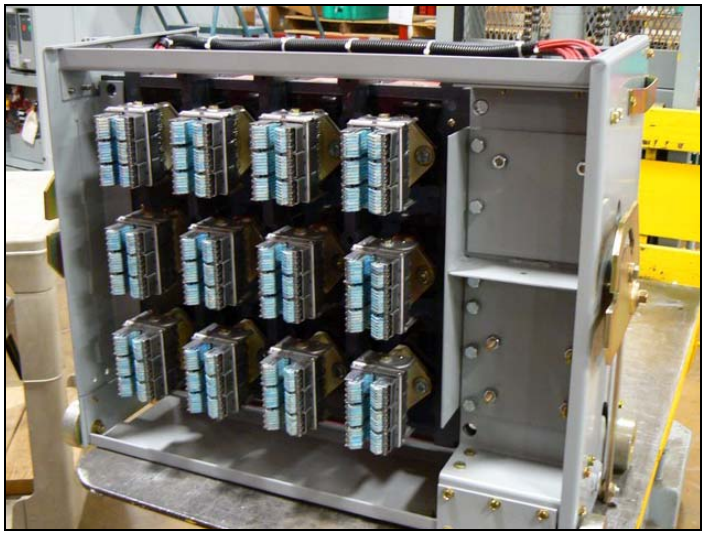

Figure 10. Rear Power Panel (4 Pole Contactor).

3.2.1 Main Contacts

The main contacts connect and disconnect the load to and from the different power sources. The main contacts for the Source 1, Source 2, and Load power sources are continuous duty devices that are rated for all classes of loads. In addition, they have high dielectric strength, heavy-duty switching and withstand capabilities, and high interrupting capacity. As shown in Figure 10, the top row are the S1 connections, the middle row are the Load connections, and the bottom row are the S2 connections.

3.2.2 Switch Interlocks (Open Transition Only)

Eaton transfer switches are electrically interlocked to prevent the two sets of main contacts from being closed simultaneously except in closed transition mode or transferring to the Bypass function.

3.2.3 Draw-out Interlocks

The ATS and Bypass switching device are electronically and mechanically interlocked to the draw-out mechanism to ensure that the switching device is always in the neutral position when connecting or disconnecting it from the line and load stabs.

The switching device will close on an available source only with the doors closed and latched. During the test mode, the ATS contactor can be electrically or mechanically operated for testing.

3.2.4 TRANSFER MECHANISM

The transfer switch uses contactor switching devices. A manual indicator on the contactor shows whether it is in the OFF (OPEN) or ON (CLOSED) position (see Figures 9 and 11). These are not visible when the doors are closed and latched. Lamps are used to show the user the position of each contactor when the door is closed. Doors must be closed and latched to operate the device.

⚠ WARNING

DO NOT ATTEMPT TO PERFORM MAINTENANCE OR SERVICE EQUIPMENT WHILE IT IS ENERGIZED. FAILURE TO FOLLOW THIS WARNING COULD LEAD TO DEATH OR SEVERE INJURY. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT ON EQUIPMENT PRIOR TO SERVICING. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING OR OPERATING EQUIPMENT.

The contactor switching device is electrically closed by momentarily energizing a solenoid. The contactor remains closed by a mechanical latch.

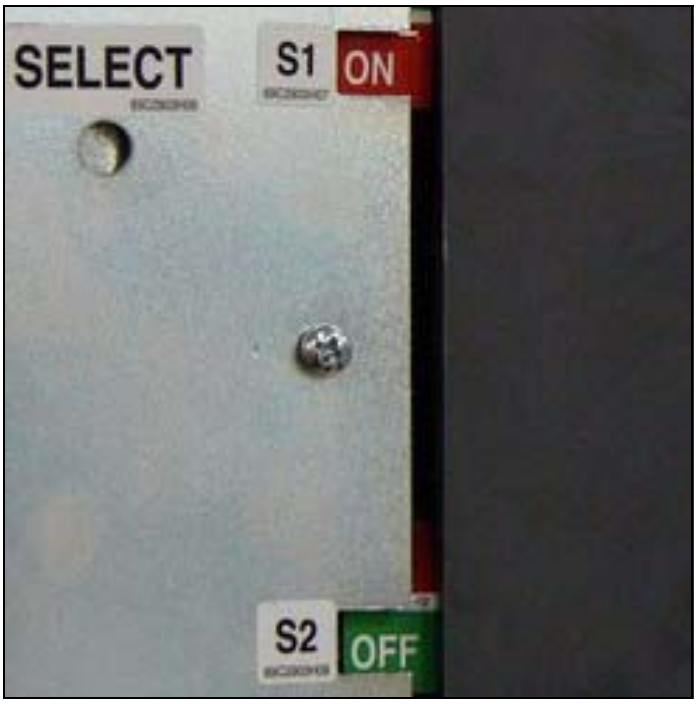

Figure 11. Manual Indicators on Contactor the Mechanism.

3.2.5 Draw-out Mechanism

The draw-out mechanism is described in detail in Section 6. The draw-out mechanism is designed to operate with the door closed and latched for additional safety. Figure 12 shows the unit being racked-in or withdrawn from the power runbacks with the door closed and latched. Figure 13 shows the unit with the door open and ready to be removed from the cell.

Figure 12. Draw-out Mechanism.

Figure 13. Unit with the Door Open (to Show Mechanism).

3.3 Voltage Selection Panel

3.3.1 North American Voltage Selection (120, 208, 240, and 480, 60 Hz), International Voltage, and 600 volts

The North American market voltage selection panel consists of multi-tap transformers, contained in a steel case mounted in the transfer switch enclosure (Figure 14). The cover has two connectors on it, with the one on the right being selectable depending on the voltage applied to S1 and S2. The transformer unit is easily removed by removing the two front screws and disconnecting the two plugs. The rear of the transformer enclosure has two flanges that are inserted into two slots. The voltage is selected by simply removing the plug from the default selected voltage on the cover plate and installing the plug to the desired available voltage. Taps are provided for 120 to 480 Vac to satisfy any required North American market application voltage. The factory default position is 480 Vac. There is a similar selection panel for international voltages. A 600 volt system has one selection.

⚠ DANGER

WHEN CHANGING THE VOLTAGE SELECTION, THE POWER MUST BE REMOVED FROM THE TRANSFER SWITCH. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT ON EQUIPMENT PRIOR TO SERVICING. FAILURE TO FOLLOW THIS WARNING COULD LEAD TO DEATH OR SEVERE INJURY. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT.

Figure 14. Transformer Selection Terminals (Shown Connected to the 120 Vac Tap).

3.4 ATC Controllers

The Controller panel provides the intelligence and supervisory circuits which constantly monitor the condition of both the Source 1 and Source 2 power sources, thus providing the required intelligence for transfer operations (see Figures 15 and 16). Detailed information for controller operation is presented in separate documents:

- ATC-300 Instruction Book (IB 01602024E - Open Transition Only); and
- ATC-800 Instruction Book (IB ATS-CI03 - Open or Closed Transition.
- There is an additional Bypass Logic Panel for controlling the interlocks, the ATS contactor removal/insertion logic, and the bypass functions

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Figure 15. ATC-300.

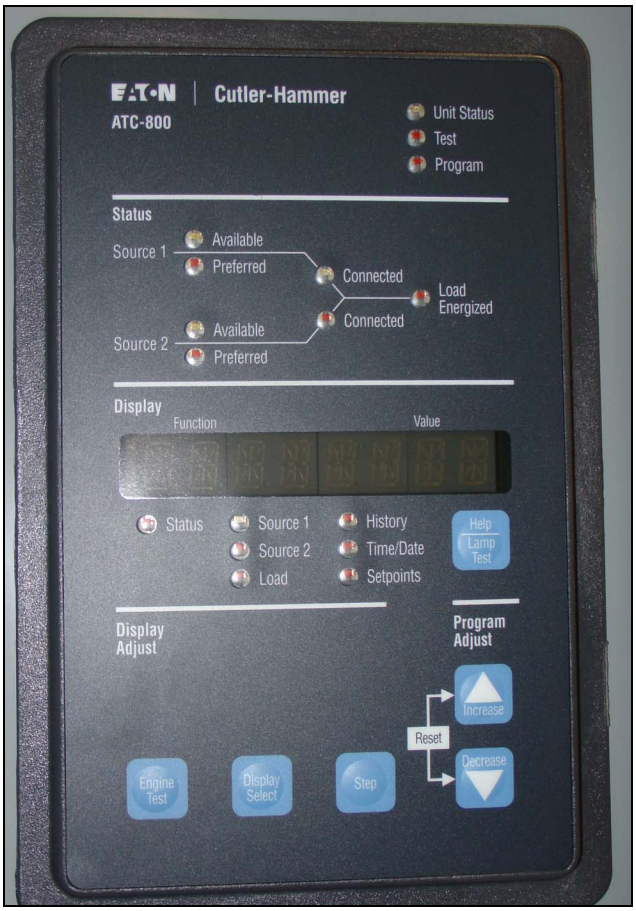


Figure 16. ATC-800.

3.5 Neutrals

All 2-pole and 3-pole transfer switches are equipped with 100% rated neutral connections. Figure 17a shows a few bus configuration options for the Bypass Isolation Switch. The drawings show a 3-pole switch. Figure 17b shows a picture of a 3 and a 4 pole switch with the copper in the standard positions with SI and the LOAD on top with S2 on the bottom. The bus is also marked with S1, S2, and neutral.

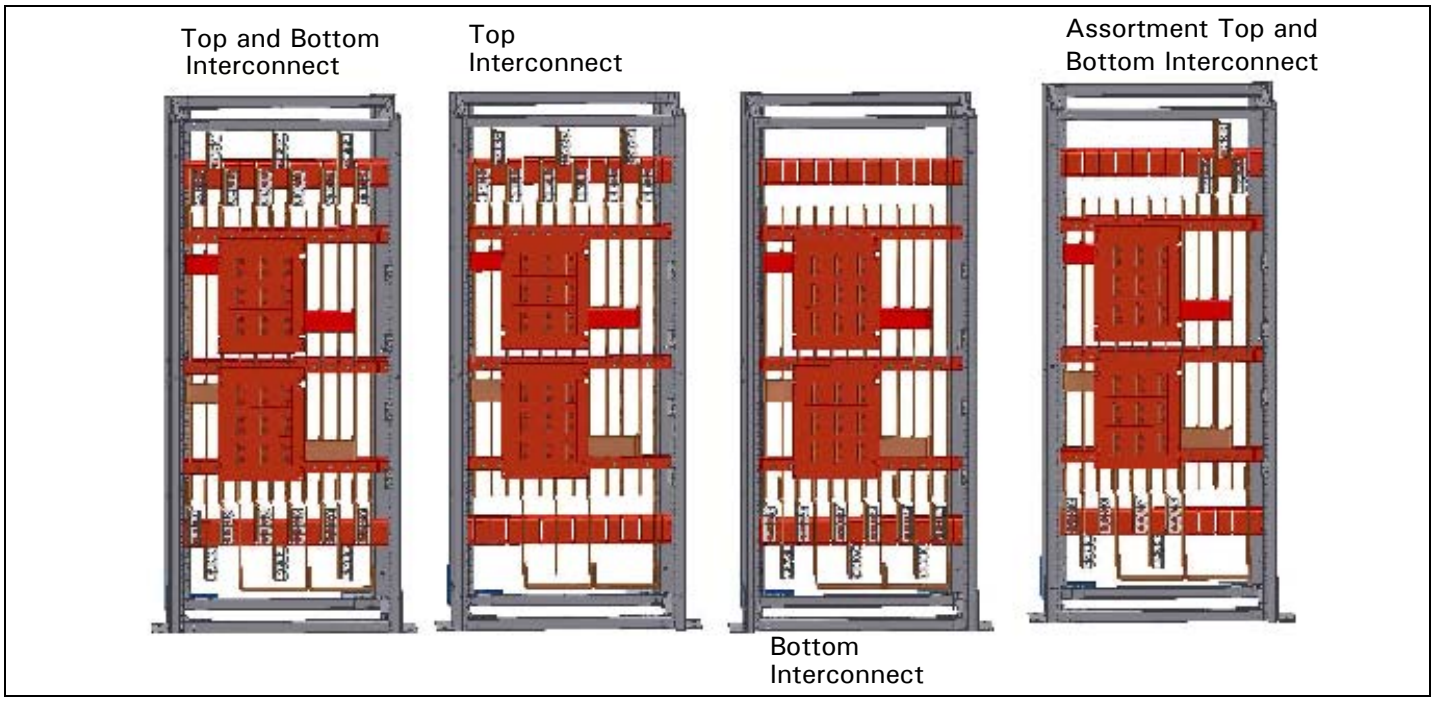


Figure 17a. Various 3 Pole Configurations.

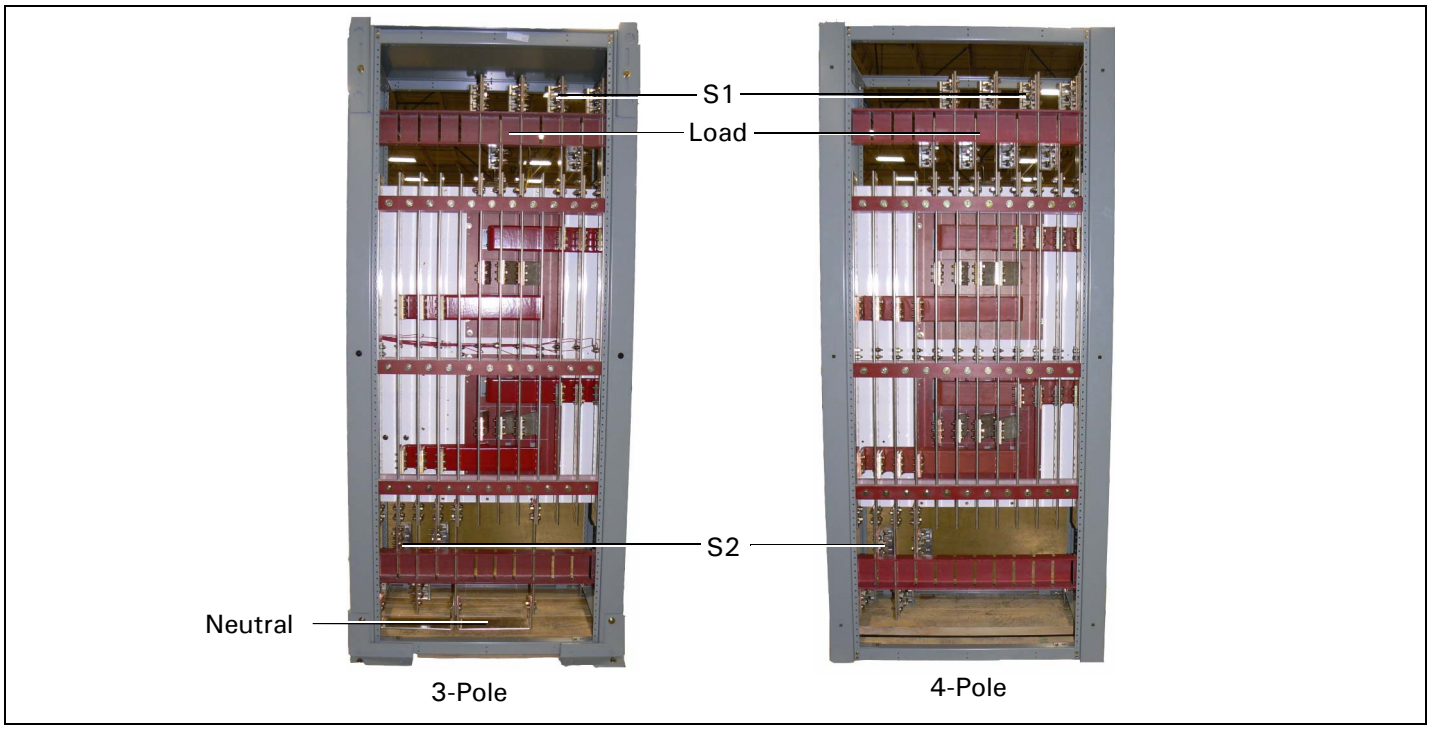


Figure 17b. 3 and 4 Pole Switch Configurations with Movable Terminal Lugs.

3.6 Features/Options

3.6.1 Features for ATC-300 Controlled Transfer Switch

A variety of standard and optional features are available for Eaton ATSs. **All features or combinations of features may not be available on specific ATSs**. All features and/or accessories are Underwriters Laboratories (UL) listed unless noted.

3.6.1.1 Standard Features

The following is a list of the standard features of the ATC-300/800 Controller.

1. Time Delay Normal to Emergency (TDNE)

This feature provides a time delay when transferring from the Source 1 to the Source 2 power source. Timing begins when Source 2 becomes available. It permits controlled transfer of the load circuit to Source 2.

Adjustable 0 - 1800 Seconds

2. Time Delay on Engine Starting (TDES)

This feature provides a time delay of the signal to initiate the engine/generator start cycle in order to override momentary power outages or voltage fluctuations of Source 1.

Adjustable 0 - 120 Seconds

3. Time Delay Emergency to Normal (TDEN)

This feature provides a time delay of the re-transfer operation to permit stabilization of Source 1. Timing begins when Source 1 becomes available. If Source 2 fails during timing, then re-transfer is immediate, overriding the time delay.

Adjustable 0 - 1800 Seconds

4. Time Delay for Engine Cool-down (TDEC)

This feature provides a time delay of the signal to initiate the engine/generator stop cycle after the re-transfer operation. This allows the engine/generator to cool down by running unloaded. Timing begins on completion of the re-transfer cycle.

Adjustable 0 - 1800 Seconds

5. Source 2 Monitoring and Protection

This feature provides monitoring and protection based on the Source 2 voltage and/or frequency setpoints. All feature five functions are "failsafe" operations.

5B. Single Phase Undervoltage and Underfrequency Protection

Adjustable Undervoltage:
Dropout (Contactor Style): 78 - 97% of nominal
Pickup: (Dropout +2%) - 99% of nominal

Adjustable Underfrequency:
Dropout (Contactor Style): 90 - 97% of nominal
Pickup: (Dropout +1Hz) - 99% of nominal

5C. 1-Phase Overvoltage/Overfrequency

Adjustable Overvoltage:
Dropout (Contactor Style): 105 - 110% of nominal
Pickup: 103% - (Dropout –2%) of nominal

Adjustable Overfrequency:
Dropout (Contactor Style): 103 - 105% of nominal
Pickup: 101% - (Dropout -1Hz) of nominal

5D. 1-Phase Undervoltage

Adjustable Undervoltage:
Dropout (Contactor Style): 78 - 97% of nominal
Pickup: (Dropout +2%) - 99% of nominal

5E. 1-Phase Overvoltage

Adjustable Overvoltage:
Dropout (Contactor Style): 105 - 110% of nominal
Pickup: 103% - (Dropout –2%) of nominal

5F. 3-Phase Undervoltage

Adjustable Undervoltage:
Dropout (Contactor Style): 78 - 97% of nominal
Pickup: (Dropout +2%) - 99% of nominal

5G. 3-Phase Overvoltage

Adjustable Overvoltage:
Dropout (Contactor Style): 105 - 110% of nominal
Pickup: 103% - (Dropout –2%) of nominal

5H. Phase Reversal

For a 3-phase wye source, this feature monitors the phase sequence of the sources. If a source does not have the same ABC or CBA sequence as the setpoint value, that source will be considered "Unavailable".

For a 3-phase delta source, this feature should be turned off via the PHASE REV setpoint.

5J. 3-Phase Undervoltage and Underfrequency Protection

Adjustable Undervoltage:
Dropout (Contactor Style): 78 - 97% of nominal
Pickup: (Dropout +2%) - 99% of nominal

Adjustable Underfrequency:
Dropout (Contactor Style): 90 - 97% of nominal
Pickup: (Dropout +1Hz) - 99% of nominal

5K. 3-Phase Overvoltage/Overfrequency

Adjustable Overvoltage:
Dropout (Contactor Style): 105 - 110% of nominal
Pickup: 103% - (Dropout –2%) of nominal

Adjustable Overfrequency:
Dropout (Contactor Style): 103 - 105% of nominal
Pickup: 101% - (Dropout -1Hz) of nominal

5L. Source 2 3-Phase Voltage Unbalance

For a 3-phase wye source, this feature monitors phase voltage ratios. Voltage unbalance (%) is calculated as the difference between the maximum and minimum phase voltage, divided by the minimum phase voltage. User-selectable setpoints are available for dropout and pickup unbalance settings (minimum 2% differential). Dropout is adjustable from 5 to 20%. Pickup is adjustable from 3 to (Dropout –2%). A setpoint for user-selectable time delay from 10 to 30 seconds is provided. The factory default setpoints are: 5% dropout, 3% pickup, and 30 seconds time delay. A user-selectable setpoint for enable and disable is also provided.

When an unbalance condition is detected on Source 2, the Unbalance Timer (TD UNBAL) starts timing. After TD UNBAL times out, Source 2 is declared "failed".

For a 3-phase delta source, this feature should be turned off via the VOLT UNBAL setpoint.

6. Test Operators

Eaton ATSs are provided with a Test Pushbutton that simulates a loss of the Source 1 power source as standard (Feature 6B). All programmed time delays (TDNE, TDEN, etc.) will be performed as part of the Test. Engine run time of the Test is equal to the Plant Exerciser (Feature 23) programmed setpoint. All Tests are Failsafe protected.

6B. Test Pushbutton

Programmable setpoints include:

1. Load, No Load Testing, or Disabled; and
2. Engine run time is equal to the Plant Exerciser (Feature 23) setting.

7. Time Delay Emergency Fail (TDEF)

This feature provides a time delay that prevents a connected emergency source from being declared "failed" in order to override momentary generator fluctuations. If the Source 2 power source remains in the failed state then, 0.5 seconds after the TDEF timer expires, the transfer switch will proceed with the programmed sequence for retransfer. This time delay is only implemented when the Source 2 power source is a generator.

Adjustable 0 - 6 Seconds

8. Time Delay Bypass Pushbutton

This feature provides a way (by pushing the Help and Step pushbutton simultaneously) to bypass the TDNE (Feature 1) and/or TDEN (Feature 2) time delays. The Time Delay Bypass function, when activated by pushing the Help and Step pushbutton simultaneously, will reduce any or all of the programmed time delay to zero.

8C. Bypass TDEN

This feature provides a membrane pushbutton to bypass the TDEN time delay.

8D. Bypass TDNE

This feature provides a membrane pushbutton to bypass the TDNE time delay.

12. Power Source Annunciation

This feature provides LEDs to give switch position and power source availability indications.

Switch Position

Provides LEDs to indicate the switch position.

12C. Source 1 - Source Connected

This feature provides a green LED that, when lit, indicates the load is connected to Source 1.

12D. Source 2 - Source Connected

This feature provides a red LED that, when lit, indicates the load is connected to Source 2.

Power Source Availability

Provides LEDs to indicate if a power source is available. LEDs may be integral or separate from the controller.

12G. Source 1 - Available

This feature provides a white LED that, when lit, indicates Source 1 is available.

12H. Source 2 - Available

This feature provides an amber LED that, when lit, indicates Source 2 is available.

14. Relay Auxiliary Contacts: This feature provides form "C" relay auxiliary contacts

14G. Source 1 Present: Provides two (2) normally open and two (2) normally closed contacts. The relay is energized when Source 1 is available.

14H. Source 2 Present: Provides two (2) normally open and two (2) normally closed contacts. The relay is energized when Source 2 is available.

15. Switch Position Indication Contact

This standard feature provides a contact that indicates if the power-switching device is in the "Open" or "Closed" position for S1 and S2.

15G & H. Switch Position 3 Form C

This optional feature provides three Dry Form "C" contacts that indicates the position of the Source 1 and Source 2 power-switching device.

23. Plant Exerciser (PE)

This feature provides a means for automatic testing of the engine/generator set or standby power system. All programmed time delays will be performed during plant exerciser operations.

23K. Plant Exerciser Selectable – Disabled/1/7/14/28 Day Interval

This feature provides for automatic test operation of the generator. Available test cycles are daily, 7, 14, or 28 days with duration equal to the programmed engine test time.

Programmable setpoints allow for selection of three test cycles:

- Engine Start/Run Only (No Load);
- Exercise with Load Transfer; or Disabled
- This is a "Failsafe" operation.

26. Source 1 - Monitoring and Protection

This feature provides Source 1 monitoring and protection functions. If the Source 1 power supply fails, then the ATC-300 will begin the sequence of operations necessary to transfer the load circuit to the Source 2 power source. All Feature 26 monitoring and protection functions are "failsafe" operations.

26A. All Phase Undervoltage Protection

This feature provides all phase undervoltage monitoring and protection.

Adjustable Undervoltage:
Dropout (Contactor Style): 78 - 97% of nominal
Pickup: (Dropout +2%) - 99% of nominal

26C. All Phase Overvoltage Protection

Provides all phase overvoltage monitoring and protection.

Adjustable Overvoltage:
Dropout (Contactor Style): 105-110% of nominal
Pickup: 103% - (Dropout -2%) of nominal

26D. Go to Source 2

This feature provides the capability for an external contact opening to initiate a load power transfer to the Source 2 power source. This includes starting the engine/generator, performing the programmed time delays, and the transfer operation. Re-transfer will occur when the external contact is closed or under a "failsafe" condition. A connection point on the controller for the connection of an external contact is included.

26E. All Phase Underfrequency Protection

Provides all phase underfrequency monitoring and protection.

Adjustable Underfrequency:
Dropout: 90-97% of nominal
Pickup: (Dropout +1Hz) - 99% of nominal

26F. All Phase Overfrequency Protection

Provides all phase overfrequency monitoring and protection.

Adjustable Overfrequency:
Dropout (Contactor Style): 103 - 105% of nominal
Pickup: 101% - (Dropout -1Hz) of nominal

26H. Phase Reversal Protection

For a 3-phase wye source, this feature monitors the phase sequence of the sources. If a source does not have the same ABC or CBA sequence as the phase reversal setpoint, the source will be considered "Unavailable".

For a 3-phase delta source, this feature should be turned off via the PHASE REV setpoint.

26L. Source 1 3-Phase Voltage Unbalance

For a 3-phase wye source, this feature monitors phase voltage ratios. Voltage unbalance (%) is calculated as the difference between the maximum and minimum phase voltage, divided by the minimum phase voltage. User-selectable setpoints are available for dropout and pickup unbalance settings (minimum 2% differential). Dropout is adjustable from 5 to 20%. Pickup is adjustable from 3 to (Dropout –2%). A setpoint for user-selectable time delay from 10 to 30 seconds is provided. The factory default setpoints are: 5% dropout, 3% pickup, and 30 seconds time delay. A user-selectable setpoint for enable and disable is also provided.

When an unbalance condition is detected on Source 1, the Unbalance Timer (TD UNBAL) starts timing. After TD UNBAL times out, Source 1 is declared "failed".

For a 3-phase delta source, this feature should be turned off via the VOLT UNBAL setpoint.

29. Alternate Transfer Modes of Operation

Provides standard or optional transfer modes, mode selection devices, and operational methods for ATSs.

29A. Automatic Operation

Provides fully automatic transfer, re-transfer, and engine/generator startup and shutdown operations.

32. Delayed Transition Transfer Modes for Open Transition Transfer Switches

This feature provides delayed transition transfer modes for an open transition transfer switch. Often used in systems with inductive loads, a delayed transition transfer switch may prevent or reduce in-rush currents due to out of phase switching of inductive loads.

32A. Time Delay Neutral

This feature provides a time delay in the neutral position during the transfer and re-transfer operations during which both Source 1 and Source 2 are disconnected from the load circuit. The time delay is programmable and is the same for both transfer and re-transfer operations.

Adjustable 0 - 120 Seconds

35. Pre-Transfer Signal

This feature provides a signal to a remote device prior to a re-transfer operation. It provides one (1) Form "C" contact (NO/NC) for interface with other equipment (typically elevator controls). The contacts close/open on a timed basis prior to transfer in either direction. After TDNE/TDEN times out, this relay closes and the Pre-transfer Timer (TPRE) starts timing. After the TPRE times out, the transfer proceeds by starting the TDN timer if enabled. The pre-transfer relay opens after the transfer is complete.

Adjustable 0 - 120 Seconds

35A. Pre-transfer Signal with 1 N.O. and 1 N.C. Contacts

This feature provides pre-transfer signal and includes one (1) N.O. and one (1) N.C. contact.

3.6.1.2 Optional Features

The following is a list of the optional features for the ATC-300 Controlled ATS. **All features or combinations of features may not be available on specific ATSs**

18. Metering and Communications

Metering options include all required external devices (CTs, etc.) for a fully functioning metering system.

18W. Ammeter

A single ammeter is a true RMS sensing device that displays single phase current only.

The ammeter can be mounted on Source 1, Source 2, or load. The meter can also be configured for 1, 2, or 3-phase sensing by supplying one meter per phase for Source 1, Source 2, or load. Ammeters for both Source 1 and Source 2 can also be grouped together.

21. Optional Power Cable Connection Terminals

Eaton Transfer Switches are provided as standard with Source 1, Source 2, and Load Circuit solderless screw-type terminals for power cable connection. Alternate terminal wire sizes may be available dependant on transfer switch type and ampere rating.

21A. Optional Power Cable Connection Terminals

This feature provides alternate power cable connection terminals. Consult Eaton for available optional terminal sizes.

38B. Stainless Steel Cover for Controller

Provides an added level of security by providing a pad lockable stainless steel cover for use with standard transfer switch logic controllers and/or associated device panels. These covers function with Eaton's ATC series logic controllers and device panels. The covers are designed for NEMA 1, 3R, 4X, and 12 applications.

41. Space Heater With Thermostat

This feature provides a space heater and non-adjustable thermostat. External control power is not required.

41A. Space Heater With Thermostat - 100 Watt

This feature provides a 100 watt (W) space heater with a non-adjustable thermostat.

51D1. CVL050 Surge Device

This feature provides a 50 kA, 600 Vac, 3 Ohm surge device. It can be mounted on the Source 1 line.

51E1. CVL080 Surge Device

This feature provides an 80 kA, 600 Vac, 3 Ohm surge device. It can be mounted on the Source 1 line.

51F1. CVL100 Surge Device

This feature provides a 100 kA, 600 Vac, 3 Ohm surge device. It can be mounted on the Source 1 line.

51G1. CHSPMAX

This feature provides 50kA, 240/120 Vac (single phase only), 1 Ohm surge device. It can be mounted on the Source 1 line.

51H1. CHSPULTRA

This feature provides a 75 kA, 240/120 Vac (single phase only), 1 Ohm surge device. It can be mounted on the Source 1 line.

51J4. Telephone Surge Protection

The telephone line surge protection feature offers 4-pair telephone line protection. The features ship loose for customer mounting convenience.

51K4. Cable Surge Protection

The TV and satellite cable surge protection feature offers two (2) coaxial line protection (cable/satellite TV). The features ship loose for customer mounting convenience.

51M. DC Surge Protection for Engine Start Connections

51M4A. This feature provides a 39 kA, 12 Vdc, surge device. This device will reduce a 6000 V transient to 80 V.

51M4B. This feature provides a 39 kA, 24 Vdc, surge device. This device will reduce a 6000 V transient to 80 V.

These features ship loose for customer mounting convenience.

3.6.2 Features for ATC-800 Controlled Transfer Switch

The primary function of ATC-800 is to accurately monitor power sources and provide the necessary intelligence to operate a transfer switch in an appropriate and timely manner. In addition, the ATC-800 provides useful present and historical data, reliable two-way communications, and programming through the device's faceplate or communications option. The ATC-800 features proprietary microprocessor technology to provide and maintain superior precision and versatility during both programming and data access.

3.6.2.1 Operational Simplicity

From installation to programming to usage, the ATC-800 was designed with operational simplicity in mind. Only one style needs to be considered, regardless of input/output requirements or system voltages and frequencies. The ATC-800 provides the functionality of numerous other devices combined in one package that mounts in less than 7 x 11 in. (177.8 x 279.4 mm) of panel space.

The user friendly front panel interface simplifies routine operation, programming, data presentation and setting adjustments. An LED based display provides the flexibility of large character displays for enhanced visibility. The operation of front panel membrane pushbuttons moves the ATC-800 display from function to function or step to step within a function. Three LEDs at the top of the faceplate provide an immediate indication as to the device's operational mode. An integral Help Mode provides immediate user assistance in the form of English language message displays through the use of a front panel Help pushbutton.

With a Product Operated Network Interface (PONI), the ATC-800 is communications ready and compatible with other devices in the IQ Family of products. The Communication Module (PONI) is available in three versions, the INCOM PONI, RS-232 PONI and PONI Modem. Reliable two-way communications can be provided over a twisted pair communications network. With the INCOM PONI, ATC-800 is compatible with the Eaton IMPACC system.

3.6.2.2 Standard and Optional Features

A variety of programmable features are available to meet a wide variety of application requirements. Individual features or feature combinations provide the intelligence required to tailor switches to individual needs.

The features are factory activated, depending upon customer requirements. The specific variable setpoints associated with standard and factory activated features are stored in a nonvolatile memory. Activated feature setpoints are available for customer adjustment. Any feature not selected and factory activated cannot be viewed or adjusted.

NOTICE

WITH RESPECT TO THEIR USE IN THIS DOCUMENT AND AS THEY RELATE TO AUTOMATIC TRANSFER SWITCH OPERATION, THE FOLLOWING WORDS OR PHRASES ARE DEFINED:

Available

A source is defined as available when it is within its undervoltage/overvoltage/underfrequency/overfrequency (if applicable) setpoint ranges for the nominal voltage and frequency setting.

Fails

A source is defined as failed when it is outside of its undervoltage/overvoltage/underfrequency/overfrequency (if applicable) setpoint ranges for the nominal voltage and frequency setting.

Normal Source

The Normal Source is defined as the source that is preferred. The Preferred Source setting allows the operator to select Source 1, Source 2, or NONE as the Preferred Source. If NONE is chosen, the Preferred Source or the Normal Source will be the source that is presently attached to the load. If the Preferred Source feature is not available from the factory, the default is set as being Source 1 as the Preferred and Normal Source.

Emergency Source

The Emergency Source is defined as the source that is not preferred. If NONE is chosen for the Preferred Source setting, the Emergency Source will be the source that is presently not attached to the load. Therefore, in this condition after a transfer, what was the Normal and Emergency Sources will switch between Source 1 and 2. If the Preferred Source feature is not available from the factory, the default is set with Source 2 as the Emergency Source.

Option #

For personnel who are familiar with previous transfer switch controller option specifications, an attempt at equivalence to some of the features is made.

ATC-800 features with a brief description follow. The actual programmable setpoints for each feature are covered in Section 5.

Standard Feature: Time Delay Engine Start (TDES)

TDES is used where the source is an engine generator. It delays initiation of the engine start circuit in order to override momentary power outages and/or fluctuations. This timer and the associated engine start circuit will operate with or without control power. There are two separate start circuits, one for each source when applications of two generators are selected, although the same TDES timer value is used for both. When one generator is selected, this timer's engine start circuit will operate on generator 2 for Source 2. If the source that is being transferred to has a generator and that source is already available, the TDES timer is bypassed.

Standard Feature: Time Delay Normal to Emergency (TDNE)

TDNE delays the transfer to the Emergency Source to permit stabilization of the Emergency power source before the transfer is made. This timer will begin the countdown from its setting value when the Emergency Source becomes available. If the Normal Source should become available during the countdown of this timer, the timer will be aborted.

Standard Feature: Time Delay Emergency to Normal (TDEN)

TDEN delays the transfer to the Normal Source to permit stabilization of the Normal power source before the transfer is made. This timer will begin the countdown from its setting value when the Normal Source becomes available. During the countdown of this timer, if the Normal Source should become unavailable, the timer will be aborted. If the Preferred Source is available and the Emergency Source fails while the TDEN timer is counting down, the TDEN timer will be bypassed.

Standard Feature: Time Delay for Engine Cool-Off (TDEC)

TDEC permits the generator to run under a no-load condition after a transfer from the generator source has been made. Countdown timing begins when the transfer is completed. In applications where two generators are selected, the same cool-off timer setting value is used for both.

Standard Feature: Time Delay Emergency Failure (TDEF)

TDEF is used where at least one source is an engine generator. TDEF will delay an available source from being declared unavailable in order to override momentary generator fluctuations. This time delay is only implemented when the load is connected to a generator source. TDEF is not displayed when the number of generators is zero.

⚠ CAUTION

CHANGING THE SYSTEM NOMINAL VOLTAGE OR FREQUENCY SETPOINTS WILL CAUSE PICKUP AND DROPOUT SETPOINTS TO CHANGE AUTOMATICALLY TO NEW DEFAULT VALUES.

Standard Feature : System Nominal Frequency (NOMF)

There are only two choices for system nominal frequency of the distribution system, 50 or 60 Hertz. The dropout/pickup, underfrequency and overfrequency upper and lower setting limits are based on the nominal frequency value.

Standard Feature: System Nominal Voltage (NOMV)

This refers to the standard system nominal RMS line to line voltage. A wide range (120 to 600) of sensing voltage is available to be programmed. The dropout/pickup, undervoltage and overvoltage upper and lower setting limits are based upon the nominal voltage value.

Standard Feature: Undervoltage Monitoring for Source 1 (1UVD, 1UVP)

This feature constantly monitors Source 1 for an undervoltage condition. When the Source 1 voltage drops to a value equal to or below the undervoltage dropout setting, the source will become unavailable. The source's voltage will then have to rise to a value that is equal to or above the pickup setting to become available again.

Standard Feature: Undervoltage Monitoring for Source 2 (2UVD, 2UVP)

This feature functions the same as Standard Feature (1UVD, 1UVP), except for Source 2 instead of Source 1.

Standard Feature: Underfrequency Monitoring for Source 2 (2UFD, 2UFP)

This feature functions the same as Optional Feature 26E, except for Source 2 instead of Source 1.

Standard Feature: Commit to Transfer During TDNE Timing (CTDNE)

This feature provides for selection as to whether or not commitment to transfer is desired when Time Delay Normal to Emergency countdown has begun. If no commitment is chosen and the Normal Source returns to availability when the TDNE timer is counting down, the transfer is aborted and the engine generator (if applicable) is cooled down.

Standard Feature: Engine Test Mode (TMODE)

This feature provides selection of the type of test that can be initiated by the front panel Engine Test pushbutton. An engine test without transferring the load to it, or an engine test with a full transfer of the load to the engine can be chosen. Load testing is fail-safe. If the generator fails during testing for any reason, the ATC-800 will signal the transfer switch to return to normal. If disable test mode is chosen, the front panel pushbutton cannot be used to initiate a test.

Standard Feature: Test Engine Run (TER)

This feature provides selection of the length of time in hours and minutes that the ATC-800 will enable the generator contacts during an Engine Test that was initiated from the front panel pushbutton or for the plant exerciser feature, if applicable.

Standard Feature 5C: Overfrequency Monitoring for Source 2 (2OFD, 2OFP)

This feature constantly monitors Source 2 for an overfrequency condition. When the Source 2 frequency rises to a value equal to or above the overfrequency dropout setting, the source will become unavailable. The source's frequency will then have to drop to a value that is equal to or below the pickup setting to become available again.

Optional Feature 5E: Overvoltage Monitoring for Source 2 (2OVD, 2OVP)

This feature constantly monitors Source 2 for an overvoltage condition. When the Source 2 voltage rises to a value equal to or above the overvoltage dropout setting, the source will become unavailable. The source's voltage will then have to drop to a value that is equal to or below the pickup setting to become available again.

Standard Feature 8C/8D: Transfer Time Delay Bypass

This feature allows an external pushbutton input to be used to bypass the timer for Standard Feature (TDNE) or Standard Feature (TDEN) individually, or both simultaneously. This feature is usually used in testing when it is not desirable to wait for completion of the timing sequence.

Standard Feature 23: Plant Exerciser (EXER)

This feature provides for the automatic test operation of the generator for a pre-selected weekly interval. When the test is running, pressing and releasing the Engine Test pushbutton will cancel the test. The day of the week, hour, and minute that exercising is desired can be programmed into the ATC-800. The type of test, whether a load transfer or just an engine test, can also be selected. Load testing is fail-safe. If the generator fails during testing for any reason, the ATC-800 will signal the transfer switch to return to normal.

Standard Feature 26C: Overvoltage Monitoring for Source 1 (1OVD, 1OVP)

This feature constantly monitors Source 1 for an overvoltage condition. When the Source 1 voltage rises to a value equal to or above the overvoltage dropout setting, the source will become unavailable. The source's voltage will then have to drop to a value that is equal to or below the pickup setting to become available again.

Standard Feature 26D: Go To Emergency

This feature enables an external contact closure to initiate a transfer from the Normal Source to the Emergency Source. If the external contact is closed and the Emergency Source fails, the ATC-800 will transfer the load back to the Normal Source.

Standard Feature 26E: Underfrequency Monitoring for Source 1 (1UFD, 1UFP)

This feature constantly monitors Source 1 for an underfrequency condition. When the Source 1 frequency drops to a value equal to or below the underfrequency dropout setting, the source will become unavailable. The source's frequency will then have to rise to a value that is equal to or above the pickup setting to become available again.

Standard Feature 26F: Overfrequency Monitoring for Source 1 (1OFD, 1OFP)

This feature constantly monitors Source 1 for an overfrequency condition. When the Source 1 frequency rises to a value equal to or above the overfrequency dropout setting, the source will become unavailable. The source's frequency will then have to drop to a value that is equal to or below the pickup setting to become available again.

Optional Feature 9B: Maintenance Selector Switch (MSS)

Marked "OFF", "ON". This feature provides selector switch disconnection of control to the transfer motor thus allowing testing of the transfer switch control logic circuitry without initiating load transfer. Manual disconnection is standard on all Eaton transfer switches. Positioning the MSS in the "OFF" position isolates the control circuit from the transfer motor, permitting manual operation of the transfer switch or testing of logic circuitry without load transfer.

Optional Feature 10: Preferred Source Selection (PRF SRC)

This feature permits the selection of either source (1 or 2) as the Preferred or Normal Source. The Normal Source is the source that the switch always looks to for availability so that it can transfer to it. When two generators are selected and the switch has transferred to the Emergency Source, the ATC-800 will constantly be waiting and attempting to start the generator on the Preferred Source so that it may return to it. IF NONE is chosen, the Preferred Source or the Normal Source will be the source that is presently attached to the load.

Optional Feature 16: Overcurrent Protection

When integral overcurrent protection is provided for either one or both sources, the need for separate upstream overcurrent protection, in most instances, is eliminated. With this factory installed feature in the ATC-800, further automatic transfer operation is locked-out until the appropriate source breaker is reset.

Optional Feature 29G: Type of Operation (Selectable Automatic or Manual)

This feature provides a two position selector switch marked Auto/Manual which permits the selection of automatic or manual operation. It includes devices for manual operation when the selector switch is in the manual position.

Optional Feature 29J: Type of Operation (MANTR)

This feature provides for a selection between an automatic transfer and re-transfer mode or a manual pushbutton re-transfer to Normal from the Emergency Source mode. If this option is not selected the factory default selection is automatic.

Optional Feature 32A: Time Delay Neutral (TDN)

This feature provides a time delay in the transfer switch Neutral position when both contactors are open. This delay takes place when the load is transferred in either direction to prevent excessive in-rush currents due to out-of-phase switching of large motor loads. This feature is not available with the Neutral Load Sense Delay (TDNLD) feature.

Optional Feature 32B: Load Voltage Decay (LDCY)

This feature utilizes the load voltage measurements to sense back EMF that is generated when the transfer switch is in the Neutral position. It provides a delay in transfer in either direction if an unacceptable level is sensed as established by a customer programmed level. The transfer will not take place until the back EMF decays below the acceptable programmed level. This feature has a separate setting of enabling or disabling the operation. If disabled, the transfer switch will not delay in the Neutral position and will transfer between the sources as fast as possible. This feature is not available with the Time Delay Neutral (TDN) Feature 32A.

Optional Feature 35: Pre-Transfer Signal (TPRE)

Typically associated with elevator controls, this feature provides for the control of an addressable relay to remotely signal an elevator that a re-transfer is about to take place. A permissive report-back signal from the elevator, telling the ATC-800 that the elevator has reached the floor and opened its doors, is also recognized to facilitate faster transfer operation. Should the permissive signal not be used or does not occur, the ATC-800 has a programmed overriding pre-transfer delay timer that can be set from 0 to 5 minutes.

Optional Feature 36: Emergency Inhibit

This feature enables the Emergency Inhibit control input to inhibit transfers to the Emergency Source. See the Control Inputs section for more information.

Optional Feature 37: Service Equipment

This factory programmed feature makes the transfer switch suitable for a service equipment rating by responding to a Go-To-Neutral input.

Optional Feature 45: Load Sequencing Capability (TSEQ)

This feature provides the sequential closure of up to ten (10) remote relays after a transfer. A customer programmed time delay is available to delay closure between each of the relays.

Optional Feature 46: Potential Transformer (PT) Ratio

This feature allows external voltage transformers to be used on the ATC-800's source and load sense inputs. Once this option is enabled, the PT Ratio setpoint can be adjusted in steps of 1, between 2:1 and 500:1. Also, when this option is enabled, the Nominal System Voltage setting will be fixed at 120 or 110 volts, depending upon the Nominal System Frequency setting. If the Nominal System Frequency setting is 60Hz then the Nominal System Voltage will be fixed at 120 volts and all voltage pick-up and drop-out setpoints will be based upon the 120 volt level. The same is true of a Nominal System Frequency of 50Hz whose Nominal System Voltage will be fixed at 110 volts. The metering display will use the PT ratio value to calculate and display the load and source voltages with up to three significant digits. There will be four possible types of displays, as an example they could display 999K, 99.9K, 9.99K, or 999 volts.

Optional Feature 47: Closed Transition

Closed Transition is a feature that will temporarily parallel two live sources in a make-before-break scheme when performing a transfer. This achieves a transfer between sources with no power interruption. Both sources must be synchronized in frequency, phase, and voltage before the transfer is initiated.

With option 47G, If the logic is forced into a fail safe mode (i.e. loss of connected source), the logic will perform a load voltage decay open transfer.

48: Communication Modules

Provides communications modules for the ATC-800 transfer switch controllers. These controllers are PowerNet and Modbus compatible devices. A separately mounted communications module will enable the automatic transfer controller to be remotely monitored controlled and programmed via the network.

48F: RS-232 and RS-485 with Modbus

Provides communications for the ATC-800 via RS-232 or Modbus through an RS-485 port. Registers are available to read back status, voltages, frequencies, and historical data. Registers are also available for transfer switch control. Setpoints may be read back and/or programmed via a pass-through command.

3.7 Enclosure

The rugged steel switch enclosure is supplied with hinges to insure proper support of the door and door mounted devices. The hinges have removable hinge pins to facilitate door removal and all doors contain connectors for easy electrical reconnect. The doors are supplied as standard with padlock latches. Cable entry holes are the customer's responsibility.

The door is used to mount a variety of lights, switches, and push buttons, depending upon the options required for a particular switch. All switch doors are supplied with a heavy duty plastic accessory panel in place, whether or not external devices are required. When lights, pushbuttons, or switches for options are required, they are normally mounted in the plastic door mounted panel.

Transfer switch enclosures and some internal steel mounting plates, such as the transformer panel mounting plate, go through a pre-treatment cleaning system prior to painting to insure a durable finish. Should the enclosure become scratched and in need of touch up paint, use ANSI 61. All remaining steel is galvanized.

The standard switch enclosure is NEMA Type 1 for general indoor use (Table 3).

Table 3. Transfer Switch Equipment Enclosures.

NEMA TYPE	DESIGN	PROTECTION
1	Indoor	Enclosed Equipment
3R	Outdoor	Rain, Ice Formation

3.8 Standards

Eaton transfer switch equipment is listed for application by UL and CSA. In addition, Eaton Automatic Transfer Switches are listed under Standard UL 1008. This standard covers requirements for Automatic Transfer Switches intended for use in ordinary locations to provide for lighting and power as follows:

a. In emergency systems, in accordance with articles 517 and 700 in the National Electrical Code (NEC), American National Standards Institute/National Fire Protection Association (ANSI/NFPA) 70 and the NFPA No. 76A and/or

b. In stand-by systems, in accordance with article 702 of the NEC and/or

c. In legally required stand-by systems in accordance with article 701 of the NEC.

Eaton Automatic Transfer Switches are available to meet NFPA 110 for emergency and stand-by power systems, and NFPA 99 for health care facilities when ordered with the appropriate options.

Section 4: Installation and Wiring

4.1 General

Eaton transfer switches are factory wired and tested. Installation requires solidly mounting the enclosed unit and connecting the power cables and auxiliary pilot circuits. Physical mounting procedures and power cable connections are covered in this section. All other required wiring or electrical connection references are covered in a separate Customer Wiring Diagram packaged with the transfer switch.

Locate the wiring booklet, review it, and keep it readily available for reference purposes during installation and testing. Once a transfer switch is properly installed and wired, it should be mechanically and electrically checked for proper installation and operation. The procedures for these initial mechanical and electrical checks are outlined in Section 7 of this instruction manual.

⚠ WARNING

BE CERTAIN THAT THE STEEL POWER PANEL BARRIERS ARE PROPERLY INSTALLED BEFORE THE TRANSFER SWITCH EQUIPMENT IS PUT INTO SERVICE. THE BARRIER PROVIDES PROTECTION FROM DANGEROUS VOLTAGE AT THE LINE AND LOAD TERMINALS WHEN THE EQUIPMENT IS IN OPERATION. FAILURE TO DO SO COULD RESULT IN PERSONAL INJURY OR DEATH.

4.2 Mounting Location

Choose a location that offers a flat, rigid mounting surface capable of supporting the weight of the enclosed transfer switch equipment. Avoid locations that are moist, hot, or dusty. However, Eaton offers enclosure designs that can be used in special environments. If there are any doubts as to the suitability of the location, discuss it with your Eaton representative.

Check to make certain that there are no pipes, wires, or other hazards in the immediate area that could create a problem. The panels provide ample room for rear cable entry from top, bottom, and sides. At no time should cable be routed to retard the action of relays or cover the logic in a way that restricts adjustments. Maintain proper electrical clearances between live metal parts and grounded metal.

For installation and maintenance purposes, the Source 1 and Source 2 power sources must have an overcurrent protective device upstream of the transfer switch, unless overcurrent protection is integral to the switch.

The dimensions of the transfer switch are an important consideration in determining proper location selection.

4.3 Unpackaging and Inspection

CAUTION

SINCE THE ENCLOSED TRANSFER SWITCH MUST BE LIFTED INTO PLACE FOR MOUNTING, BE CERTAIN THAT ADEQUATE RESOURCES ARE AVAILABLE FOR LISTING TO AVOID PERSONNEL INJURIES OR EQUIPMENT DAMAGE.

Proceed with the following four steps.

Step 1: Carefully uncrate the transfer switch. If damage is visible, please contact your local Eaton sales representative or the factory.

Step 2: Open the door and visually verify that there are no broken or damaged components or evidence of distorted metal or loose wires as a result of rough handling.

Step 3: A label on the door provides specifications for your transfer switch. Verify that these specifications comply with your requirements.

Step 4: Remove any braces or packing used to protect the transfer switch or internal components during shipping.

CAUTION

EXTREME CARE SHOULD BE TAKEN TO PROTECT THE TRANSFER SWITCH FROM DRILL CHIPS, FILLINGS, AND OTHER CONTAMINANTS WHEN MAKING THE CABLE ENTRY HOLES AND MOUNTING THE ENCLOSURE TO PREVENT COMPONENT DAMAGE OR A FUTURE MALFUNCTION.

4.4 Mounting Procedure

NOTICE

CABLE ENTRY HOLES ARE NOT PART OF THE ENCLOSURE WHEN SHIPPED FROM THE FACTORY AND MUST BE PROVIDED IN THE FIELD, EITHER BEFORE OR AFTER MOUNTING THE ENCLOSURE.

With the enclosed transfer switch equipment unpacked and ready for mounting, proceed with the following steps.

Step 1: Mounting and cabling access is best provided by removing side and rear covers (when applicable). See Section 9.3 for cover removal instructions.

Step 2: Gently maneuver the switch into its location using all of the supplied lift brackets.

Step 3: Bolt the enclosure to the base. Use separate cleats (Option 42 only) if Seismic Uniform Building Code (UBC) Zone 4 certification is desired (Figure 18), and secure with 1/2-13 UNC Grade 5 hex bolts.

Step 4: Tighten bolts to 75 ft-lbs (68 Nm).

Step 5: Double check to ensure that all packing and shipping material has been removed

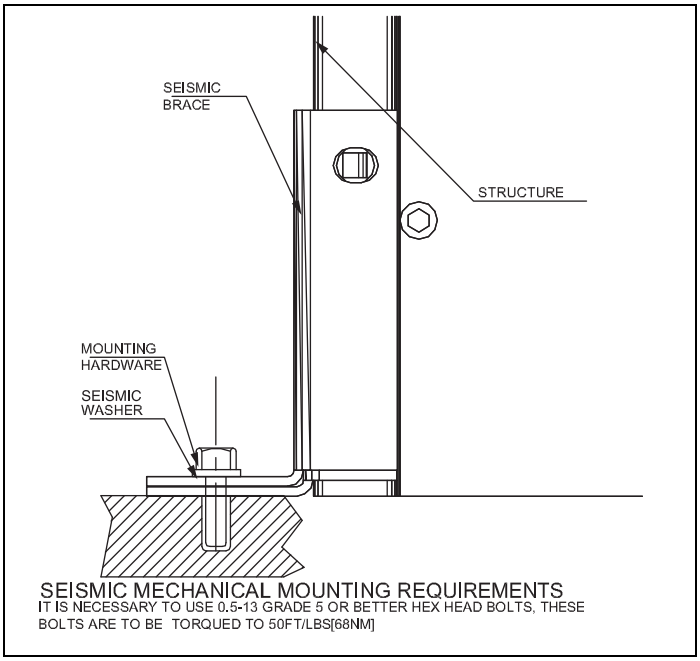


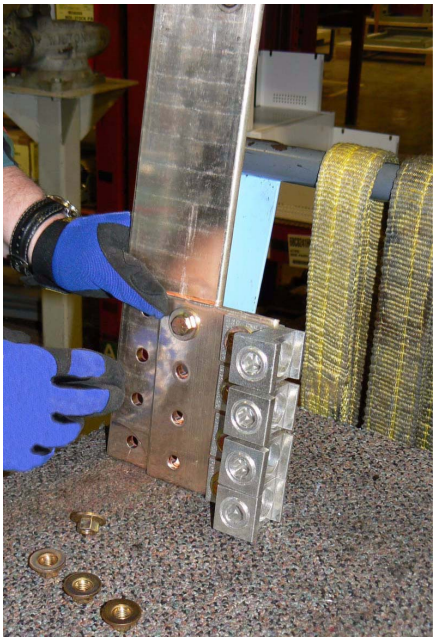
Figure 18. Seismic Tested and Approved Product Mounting Instructions.

4.5 Power Cable Connections

Figures 17 and 18 showed a few interconnect options for the Bypass Isolation Switch. The figures show a 3-pole and 4-pole device. The bus is labeled inside the unit. The standard is S1 and Load on the top and S2 on the bottom. Figure 19 (A-E) is a procedure for changing the copper orientation to allow service from the top instead of the bottom, etc.

A. Remove Copper.

B. Remove Lug Pad.



C. Mount Lug Pad on Same Face of Standoff, but in Opposite Direction as Shown.

D. Reinstall Copper Extension.

E. Torque All Copper to Copper Connection to 400 in. lbs.

Figure 19. Procedure for Changing Copper Orientation.

⚠ DANGER

POWER CONDUCTORS MAY HAVE VOLTAGE PRESENT THAT CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. DE-ENERGIZE ALL POWER AND CONTROL CIRCUIT CONDUCTORS TO BE CONNECTED TO THE TRANSFER SWITCH EQUIPMENT BEFORE INITIATING WORK WITH THE CONDUCTORS AND/OR TERMINATING THEM TO THE EQUIPMENT. ALWAYS VERIFY THAT NO VOLATGE IS PRESENT ON THE EQUIPMENT PRIOR TO SERVICING. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING EQUIPMENT.

⚠ CAUTION

USE OF CABLE LUGS NOT DESIGNED FOR THE TRANSFER SWITCH APPLICATIONS MAY CAUSE HEATING PROBLEMS.

⚠ CAUTION

TO HELP PREVENT COMPONENT DAMAGE OR FUTURE MALFUNCTIONS, USE EXTREME CARE TO KEEP CONTAMINANTS OUT OF THE TRANSFER SWITCH EQUIPMENT WHEN MAKING POWER CABLE CONNECTIONS.

Proceed with the following steps:

Step 1: Verify that the line and load cables comply with applicable electrical codes.

Step 2: Verify that the transfer switch rated current and voltage (see identification plate on the door of the transfer switch) agree with system current and voltage.

Step 3: After the transfer switch is mounted, provide the conduit or cable openings as required. Ensure that no metal filings contaminate the transfer switch components.

Step 4: Test all power cables before connecting them to the unit to insure that the conductors or the cable insulation have not been damaged while being pulled into position.

Step 5: Carefully strip the insulation from the power cables. Avoid nicking or ringing of the conductor strands. Prepare the stripped conductor termination end by cleaning it with a wire brush. If aluminum conductors are used, apply an appropriate joint compound to the clean conductor surface area. Refer to Figure 19 for the approximate locations of the power connections.

Power cables are to be connected to solderless screw type lugs located on the transfer switch switching devices. Refer to the separate Customer Wiring Diagrams supplied with the transfer switch equipment for power termination. Verify that the lugs supplied will accommodate the power cables being used. Also verify that the cables comply with local electrical codes. Standard transfer switch equipment, as supplied from the factory, will accommodate the wire sizes shown in Table 4.

Table 4. Transfer Switch Equipment Wire Sizes

TRANSFER SWITCH AMPERE RATING	WIRE SIZE RANGES	NUMBER OF CABLES PER PHASE	TERMINAL TEMPERATURE RATING °C (°F)
30-100	#14-3/0	1	75 (167)
150	#6-300KCMIL	1	75 (167)
225-300	#3-350KCMIL	1	75 (167)
400	#3-350KCMIL	2	75 (167)
600 (3P)	#1-500KCMIL	2	75 (167)
600 (4P)	#3/0-400KCMIL	3	75 (167)
800-1200	#3/0-500KCMIL	4	75 (167)

WARNING

POWER CONDUCTORS AND CONTROL WIRING MAY HAVE VOLTAGE PRESENT THAT CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. DEENERGIZE ALL POWER AND CONTROL CIRCUIT CONDUCTORS BEFORE BEGINNING TO PERFORM ANY WIRING ACTIVITY TO OR WITHIN THE ATS EQUIPMENT. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT ON EQUIPMENT PRIOR TO SERVICING. WHILE ENERGIZED, AN ARC FLASH AND SHOKC HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT.

Power sources, load conductors, and control wiring should be connected to locations as indicated in the customer wiring diagram supplied with the ATS equipment.

CAUTION

ENSURE THE ATS VOLTAGE IS SET CORRECTLY. IT SHOULD BE THE SAME AS THE SOURCE 1 AND SOURCE 2 LINE VOLTAGES. OPERATING THE EQUIPMENT ON IMPROPER VOLTAGE CAN CAUSE EQUIPMENT DAMAGE.

Once the ATS equipment has been installed and wired, perform the initial mechanical and electrical procedures as outlined in Section 6 to verify that the equipment is installed and operating properly.

CAUTION

IMPROPER POWER CABLE CONNECTIONS CAN CAUSE EXCESSIVE HEAT AND SUBSEQUENT EQUIPMENT FAILURE. ENSURE ALL CONNECTIONS ARE TORQUED TO VALUES AS INDICATED ON THE LABEL AFFIXED TO THE EQUIPMENT DOOR.

Option 14 Contact Ratings:

	RESISTIVE	GENERAL USE	MOTOR
240 VAC	10A	7A	1/3 hp, 240 Vac
			1/6 hp, 120 Vac

Option 15 Contact Ratings:

	RESISTIVE	LAMP	INDUCTIVE	MOTOR	IN-RUSH
	NC NO	NC NO	NC NO	NC NO	NC NO
125VAC	10A	2A 1A	6A	3A 1.5A	30A 5A
240VAC	10A	1.5A 0.7A	4A	2A 1A	30A 15A

CAUTION

ENSURE THAT SWITCH IS PROPERLY GROUNDED. IMPROPER GROUNDING CAN CAUSE EQUIPMENT DAMAGE.

Step 6: Tighten the cable lugs to the torque identified on the label affixed to the door. For type AB-750-4 terminal lugs, the value is 550 in/lbs.

Step 7: Make the necessary connections of any options using the wiring diagrams supplied with the unit.

4.5.1 Customer Interface Terminal Blocks

There are terminal blocks inside the unit for customer interface. The terminal blocks provide a set of auxiliary form C contacts for each contactor (ATS and Bypass). Up to two more Form C contacts can be brought out as an option. There are also terminal blocks for Engine Start, power (line and common) for any AC required up to 10 amps continuous and other interfaces.

TB3	AC Neutral
TB4	Auxiliary Contacts
TB6 (1 and 2)	Engine Start
TB6 (11 and 12)	Go To S2
TB6 (15 and 16)	S2 Inhibit (Option 36)
TB6 (7 and 8)	Alarm (Option 81A)
TB7	AC Line (120 volts)
TB8 (1 and 2)	Closed Transition (Option 47)

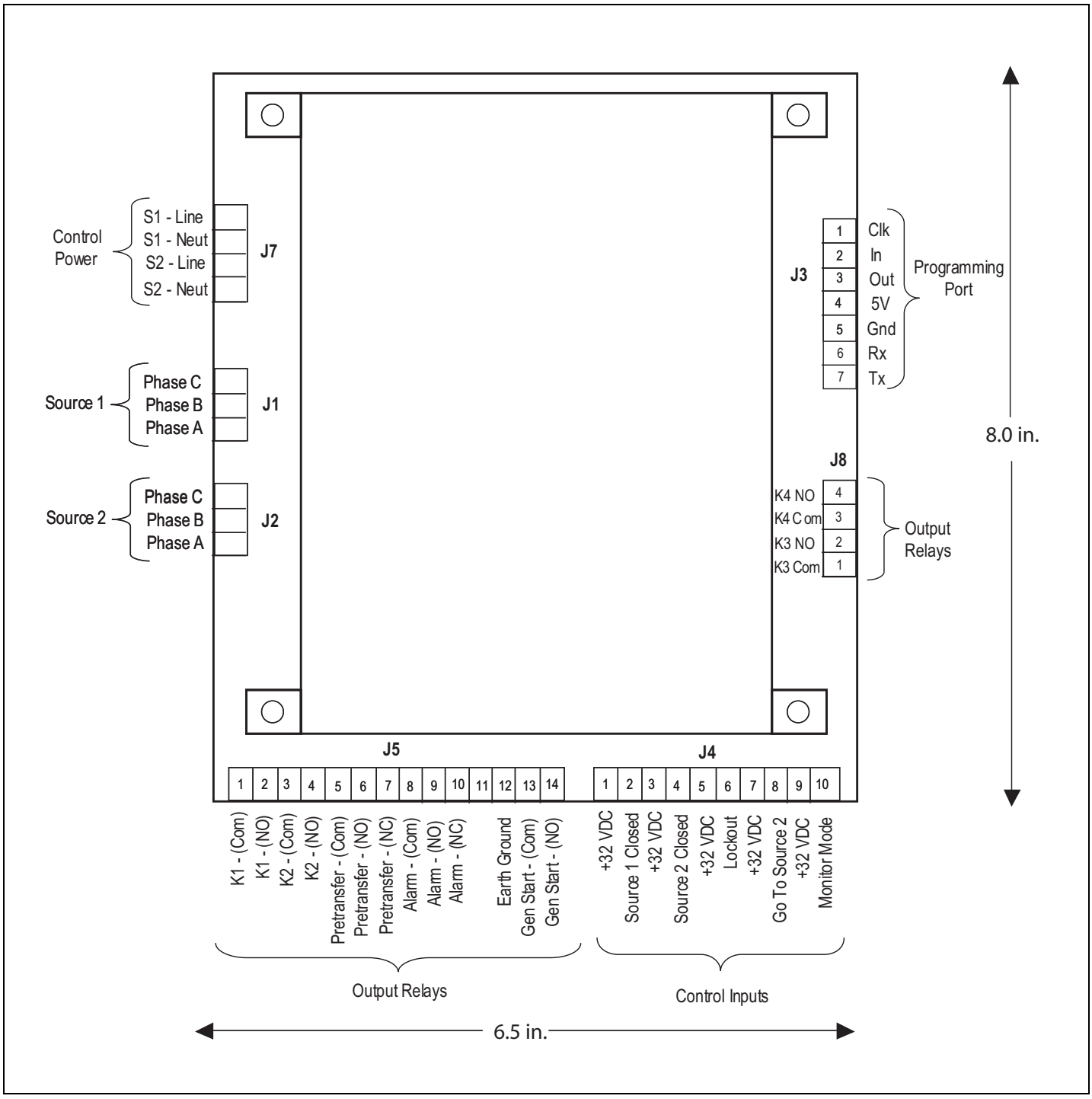


Figure 20. Location of Terminals 13 and 14 on the J-5 Connector on the ATC-300 Controller.

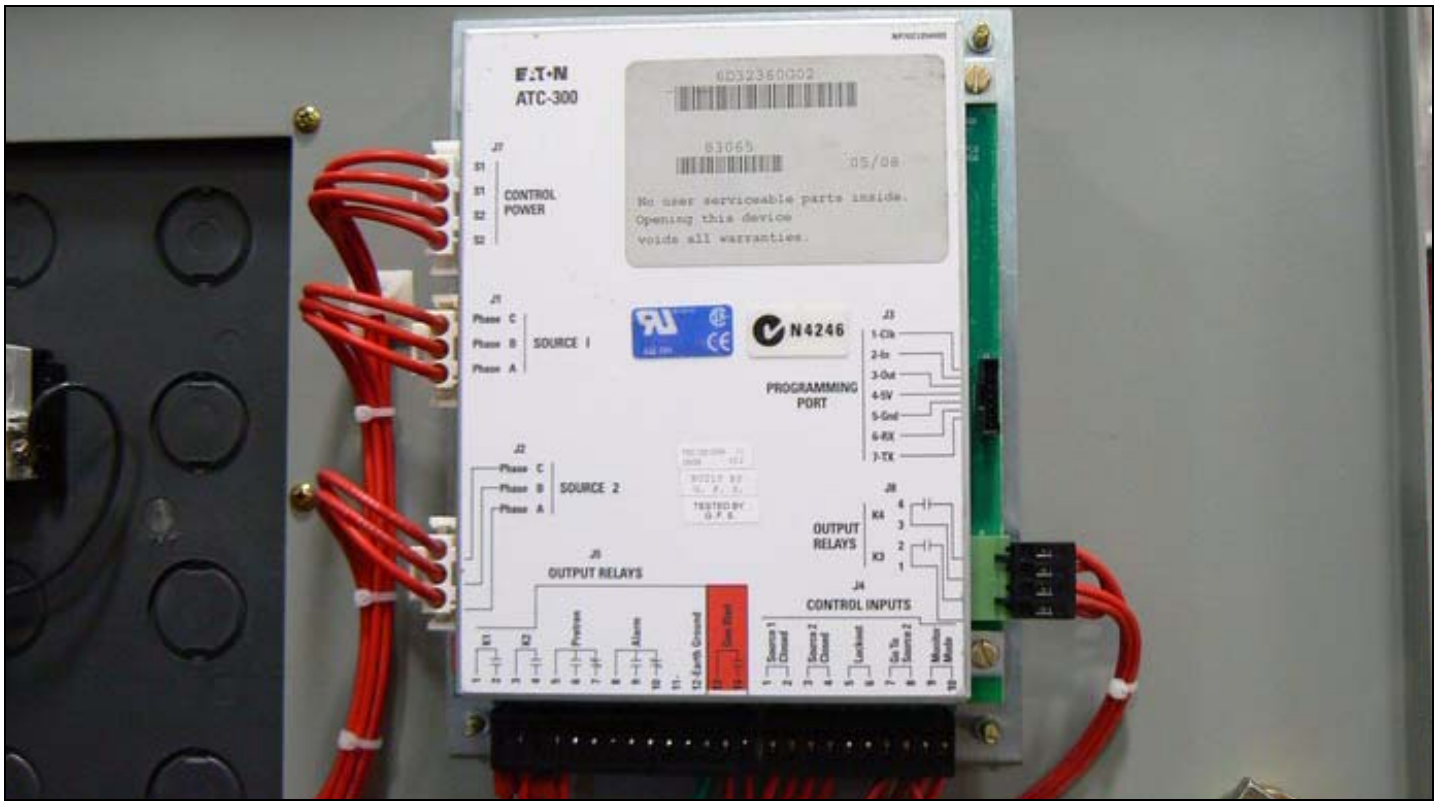


Figure 21A. Bypass Contactor ATS (Rear View of ATC-300 Controller).

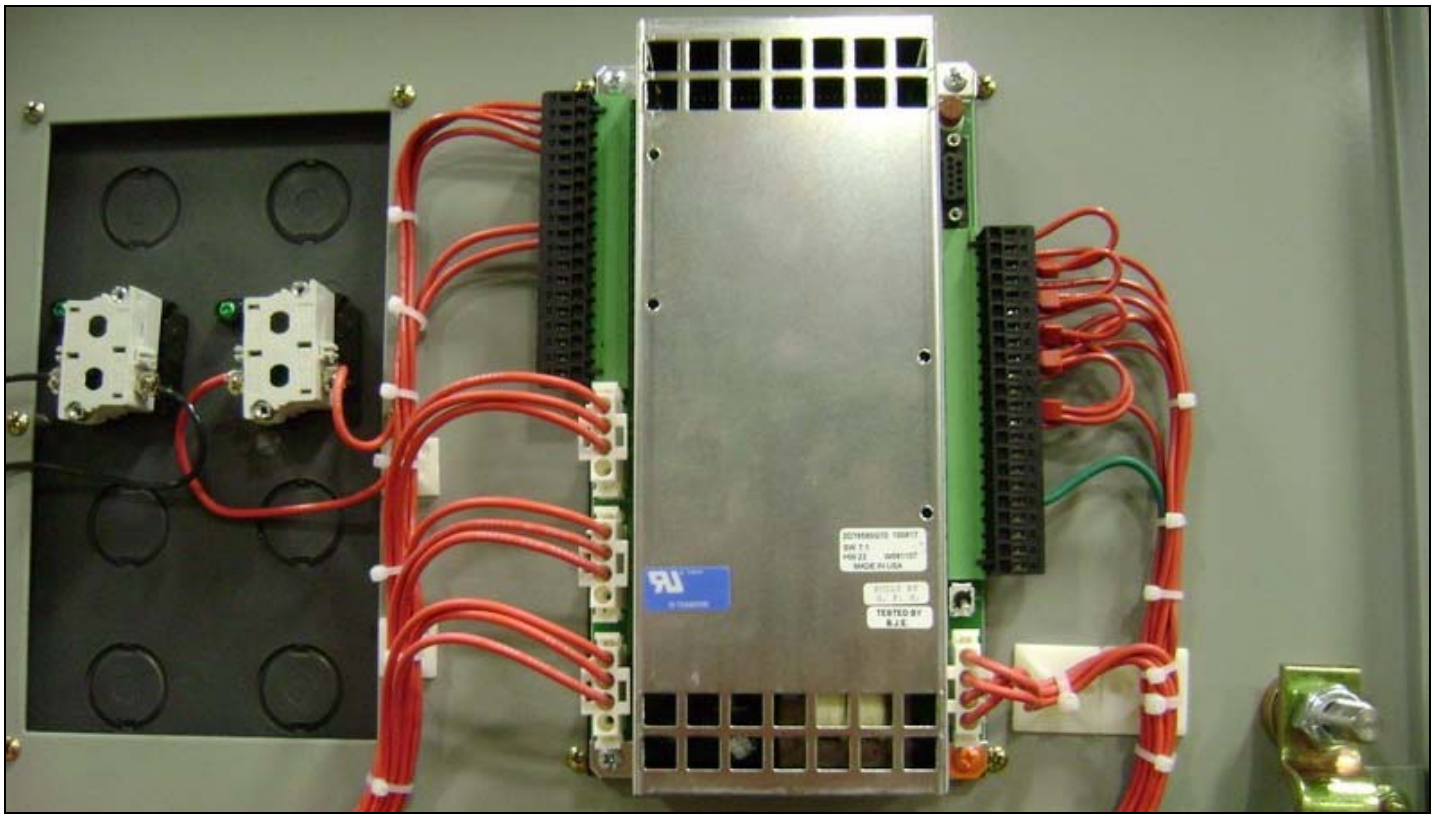


Figure 21B. Bypass Contactor ATS (Rear View of ATC-800 Controller).

4.6 Voltage Selection Adjustment

Certain devices, such as the voltage selection panel, sensing relays, and timers need to be set and/or calibrated prior to placing the transfer switch equipment into service. Adjustments for logic devices are described in the separate instructional document dedicated to the specific logic being used. Voltage selection adjustments are described here.

Figure 22. Voltage Selection Adjustment (120Vac is shown selected).

⚠ WARNING

DISCONNECT ALL SOURCES OF POWER PRIOR TO SELECTING OPERATING VOLTAGE. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT ON EQUIPMENT PRIOR TO SERVICING. WHILE ENERGIZED, AND ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT. FAILURE TO DO SO MAY RESULT IN SERIOUS INJURY OR DEATH.

The voltage is selected by simply removing the plug from the default selected voltage on the cover plate of the transformer panel and installing the plug to the desired available voltage. The 600 volt is a single tap.

⚠ CAUTION

BE SURE THAT THE CORRECT VOLTAGE IS SELECTED TO MATCH THE SYSTEM VOLTAGE. AN IMPROPER SELECTION AND/OR CONNECTION COULD RESULT IN EQUIPMENT DAMAGE.

4.7 Wiring

⚠ CAUTION

POWER CONDUCTORS AND CONTROL WIRING MAY HAVE VOLTAGE PRESENT THAT CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. DE-ENERGIZE ALL POWER OR CONTROL CIRCUIT CONDUCTORS BEFORE BEGINNING TO PERFORM ANY WIRING ACTIVITY TO OR WITHIN THE TRANSFER SWITCH EQUIPMENT. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT ON EQUIPMENT PRIOR TO SERVICING. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT.

Power sources, load conductors, and control wiring should be connected to locations as indicated in the Customer Wiring Diagrams supplied with the transfer switch equipment.

4.7.1 Customer Interface Terminal Blocks

There are terminal blocks inside the unit for customer interface. The terminal blocks provide a set of auxiliary form C contacts for each contactor (ATS and Bypass). Up to two more Form C contacts can be brought out as an option. There are also terminal blocks for Engine Start, power (line and common) for any AC required up to 10 amps and other interfaces.

TB3	AC Neutral
TB4	Auxiliary Contacts
TB6 (1 and 2)	Engine Start
TB6 (11 and 12)	Go To S2
TB6 (15 and 16)	S2 Inhibit (Option 36)
TB6 (7 and 8)	Alarm (Option 81A)
TB7	AC Line (120 volts)
TB8 (1 and 2)	Closed Transition (Option 47)

Note: Prior to making the engine start connection to the switch on bypass isolation units if provided as an option, set the engine generator controls selector switch in the OFF position to prevent an unwanted engine start. A contact, if provided, closes between these terminal blocks when an engine start signal is provided by the ATS logic.

4.7.2 Closed Transition Connections

Option 47 is for Closed Transition. If that option is ordered, the unit will arrive from the factory with the Closed Transition provided. There is the ability to make the unit into an open transition if desired by following these simple steps.

Closed to Open Transition

1. Configure ATC-800 Controller to OPEN Transition
2. Remove the jumper between TB8-1 and TB8-2

To go back to a Closed Transition Switch, simply reverse this procedure.

Section 5: Operation of the Bypass Isolation Transfer Switch

5.1 General

WARNING

THE SWITCH CONTAINS A SPECIAL CONTACT ARRANGEMENT (OVERLAPPING CONTACTS). MISUSE CAN RESULT IN DEATH, SEVERE PERSONAL INJURY, AND/OR PROPERTY DAMAGE.

A transfer switch provides main contacts to connect and disconnect the load to and from the Source 1 and Source 2 power sources.

WARNING

NEVER OPERATE THE TRANSFER SWITCH MANUALLY VIA THE OPERATING HANDLE WITH POWER ON S1 AND/OR S2. FAILURE TO HEED THIS WARNING COULD RESULT IN DEATH OR SEVERE INJURY. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT ON THE EQUIPMENT PRIOR TO OPERATING MANUALLY. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT.

5.2 Operator Panel

The design of this transfer switch allows quick removal of the ATS contactor for inspection or maintenance or, if required, quick replacement.

The Bypass Isolation Switch has two operator panels on the top (Bypass) door (see Figure 23) with switches and lights (see Figures 24 and 25). The Kirk-Key must be in the top door and turned clockwise (as shown in Figure 25) for the system to operate normally in the AUTO position. The following descriptions are for those features that are standard with the Bypass Isolation Switch. The Push-To-Test button allows testing of the transfer switch with the generator. Pushing the button two times will simulate a power failure, causing the transfer switch to start the transfer sequence. Pressing the button again will restore regular power. Additional features are described in the options section of the ATC controller IBs.

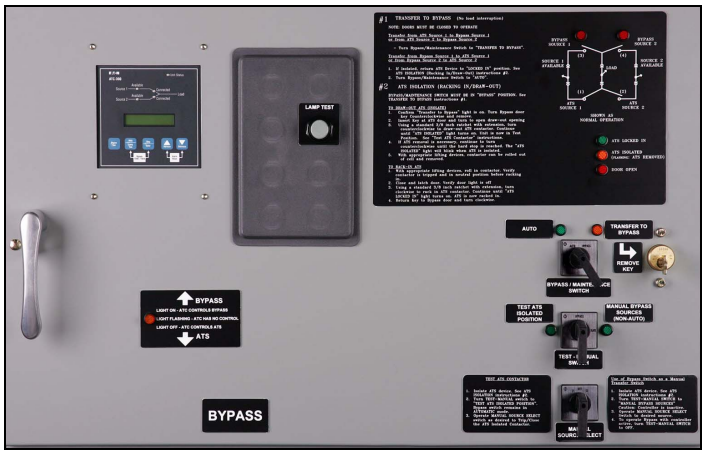


Figure 23. Top Bypass Door.

The top left side of the door contains the ATC-300 or the ATC-800 controller and a single light below the ATC. It also contains a control panel with some standard features and also additional optional features.

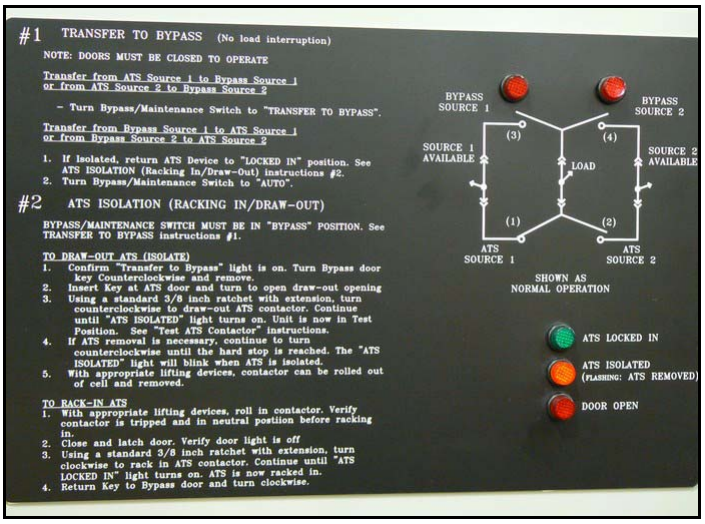


Figure 24. Lights.

The top right side of the door contains the lights, and abbreviated instructions. The lamps are used when the switch is in the bypass position. All lamps will be off when the Bypass/Maintenance Switch is in the "Auto" position. The "ATS Locked In" and the "Auto" light will remain illuminated when the switch is in the "Auto" position for 30 seconds. The right side of the door contains the following standard features:

1. Light to indicate if the Source 1 power source is available (Available with ATC-800 only).
2. Light to indicate if the Source 2 power source is available. (Available with ATC-800 only).
3. Light to indicate if the Bypass contactor Source 1 position is energized, that is, the Source 1 switching device in the automatic transfer switch is closed.
4. Light to indicate if the Bypass contactor Source 2 position is energized, that is, the Source 2 switching device in the automatic transfer switch is closed.
5. Light to indicate that the ATS unit is locked in.
6. Light to indicate that the ATS is withdrawn or isolated from the S1 or S2 power stabs but still connected for testing. When the secondary connector is not connected, the unit is in the removed position and the "ATS Isolated" light will start flashing.
7. Light to indicate that the ATS door, the Bypass door, or both doors are not latched. The doors must be closed and latched for unit to operate.
8. Two lights associated with the Bypass/Maintenance functions.
9. Two lights associated with the Test-Manual Switch. The bottom right side of the door contains the three switches for performing bypass, ATS testing, and Bypass Manual mode. It also contains the key control.

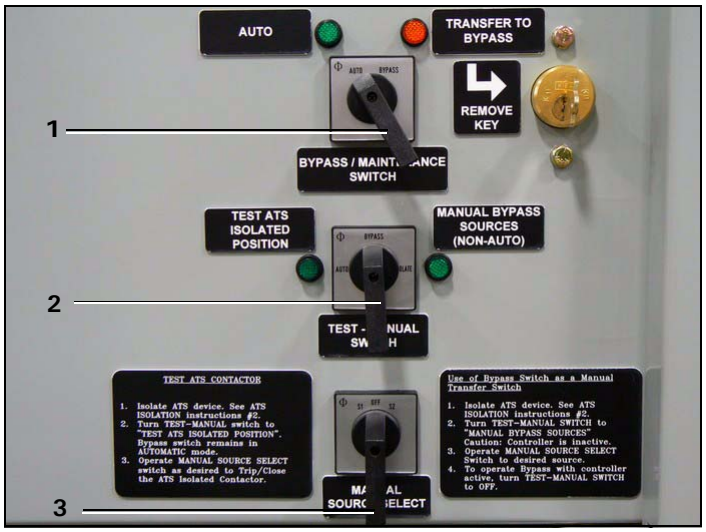


Figure 25. Switches.

1. Two position Bypass/Maintenance Switch for switching between Auto and Bypass functions.
2. Three position Test-Manual Switch for switching between ATS Testing and Bypass Manual operation. This switch is functional only when the ATS contactor is in the test position or isolated. Turning this switch at anytime, to the "Manual Bypass" position and back to "Off" will also reset the Controller (ATC-300 or ATC-800).
3. Three position spring loaded to center Manual Source Select switch to force either contactor to switch to S1 or S2 with the ATS isolated or removed.

5.3 Automatic Operation

The intelligence/supervisory circuits on Eaton transfer switches constantly monitor the condition of both the Source 1 and Source 2 power sources. These circuits automatically initiate an immediate transfer of power from the Source 1 to the Source 2 power source when the power source fails or the voltage level drops below a preset value. Transfer back to the Source 1 power source is automatic upon return of the Source 1 power source. Monitoring the power source is always performed on the line side of the power source to which the switch is connected. The Source 1 power source is usually the preferred source and the transfer switch will always seek this source when it is available and when it is selected in the ATC-800. The ATC-300 is automatically set for the preferred source to be S1.

The intelligence/supervisory circuits will continue to function no matter what contactor is being utilized: the ATS contactor or the Bypass contactor. This key feature allows for a redundant automatic switch.

5.4 Transfer to Bypass (Bypassing the Transfer Switch)

⚠ WARNING

THE CLOSED TRANSITION PRODUCT CONTAINS A SPECIAL CONTACT ARRANGEMENT (OVERLAPPING CONTACTS). MISUSE CAN RESULT IN DEATH, SEVERE PERSONAL INJURY, AND/OR PROPERTY.

5.4.1 Source 1 ATS to Source 1 BYPASS and Back to Source 1 ATS

The ATS Contactor (S1) device can be bypassed and isolated by the following sequence (see Figure 25).

1. All doors must be closed and latched. The Door Open light should not be flashing.
2. If desired, move the Generator Selector Switch to the OFF position to avoid nuisance starts, if this option is provided.
3. Turn Bypass/Maintenance Switch to "Transfer to Bypass." The Transfer to Bypass light will illuminate when the Bypass contactor is closed to S1 and the ATS contactor is tripped. The intelligence/supervisory circuits will constantly monitor the condition of both the Source 1 and Source 2 power sources and automatically initiate a transfers of power from the Source 1 to the Source 2 on the Bypass contactor. The Bypass unit is now an automatic transfer switch. The Bypass/ATS light will now be on showing that the ATC controller is now actively controlling the Bypass part of the switch. Figure 23 shows the amber light on the left side of the top door.
4. If desired, draw-out the ATS contactor (see Section 6).
5. Inspect and/or perform the needed maintenance on the ATS switching device.
6. Rack-in the ATS contactor (see Section 6) until the ATS is locked in. Turn Bypass/Maintenance Switch to "Auto." The Kirk-Key must be returned and turned clockwise in the upper lock after closing the draw-out opening or the unit will not go back to the Auto mode. The Auto light will illuminate when the ATS contactor is closed to S1 and the Bypass contactor is tripped. The "ATS Locked In" and the "AUTO" lights will remain illuminated for a short time when switching back to Auto mode.
7. The ATS contactor is now back in automatic operation. The intelligence/supervisory circuits will constantly monitor the condition of both the Source 1 and Source 2 power sources and automatically initiate transfers of power from the Source 1 to the Source 2 on the ATS contactor. There are two redundant lamps that are shown in Figure 26. These two lamps are also on the top door in Figure 25. These lamps are redundant to aid in the drawing-out and racking-in of the contactor

5.4.2 Source 2 ATS to Source 2 BYPASS and Back to Source 2 ATS

The ATS Contactor (S2) device can be bypassed and isolated by the following sequence (see Figure 25).

1. All doors must be closed and latched. The Door Open light should not be flashing.

2. Turn the Bypass/Maintenance Switch to "Transfer to Bypass." The Transfer to Bypass light will illuminate when the Bypass contactor is closed to S2 and the ATS contactor is tripped. The intelligence/supervisory circuits will constantly monitor the condition of both the Source 1 and Source 2 power sources and automatically initiate transfers of power from the Source 1 to the Source 2 on the Bypass contactor. The Bypass unit is now an automatic transfer switch. The Bypass/ATS light will now be on showing that the ATC controller is now actively controlling the Bypass part of the switch. Figure 23 shows the amber light on the left side of the top door.
3. If desired, draw-out the ATS contactor (see Section 6).
4. Inspect and/or perform the needed maintenance on the ATS switching device.
5. Rack-in the ATS switching device (see Section 6) until the ATS is locked in. Turn the Bypass/Maintenance Switch to "Auto." The Kirk-Key must be returned and turned clockwise in the upper lock after closing the draw-out opening or the unit will not go back to the Auto mode. The Auto lights will illuminate when the ATS contactor is closed to S2 and the Bypass contactor is tripped.
6. The ATS switching device is now back in automatic operation. The intelligence/supervisory circuits will constantly monitor the condition of both the Source 1 and Source 2 power sources and automatically initiate transfers of power from the Source 1 to the Source 2 on the ATS contactor. The "ATS Locked In" and the "AUTO" lights will remain illuminated for a short time when switching back to Auto mode. There are two redundant lamps that are shown in Figure 26. These two lamps are also on the top door in Figure 25. These lamps are redundant to aid in the draw-out and rack-in of the contactor.

Figure 26. Bypass Bottom Lights.

5.5 Test-Manual Switch Operation

After Draw-out, the ATS can be tested using the Test-Manual Switch. The Test-Manual Switch can also function as a manual (electrical) switch to close the Bypass contactor to S1 or S2.

⚠ CAUTION

THE MANUAL OPERATION OF THE BYPASS UNIT WILL RESULT IN THE CONTROLLER BEING INACTIVE IN CONTROLLING THE BYPASS CONTACTOR

5.5.1 Testing the ATS

To test the ATS after Draw-out:

1. When in Bypass mode and with the ATS drawn-out, switch the Test-Manual Switch to the "Test ATS Isolation Position". The Bypass contactor will remain in automatic mode.
2. Open the bottom door by inserting a straight tool into the hole and pulling up. Turn the handle.
3. Electrical test can be performed on the ATS contactor by using the Manual Source Select switch. This switch is spring loaded to center. Switching to S1 or S2 will close the contactor after a 1 second delay. One can also stop the unit in the closed or trip position if desired or do redundant operations.
4. A manual test may also be performed by inserting the handle on the shaft of the mechanism and pushing up for closing on S1 or pushing the handle up and pushing in the select for closing on S2. See Section 5.5.3 for full instruction on the manual operation of the contactor.

⚠ WARNING

HAZARDOUS VOLTAGES IN AND AROUND TRANSFER SWITCH EQUIPMENT DURING THE TROUBLE SHOOTING PROCESS CAN CAUSE PERSONAL INJURY AND/OR DEATH. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT.

5.5.2 Electrically Manual Mode for the Bypass

To switch the Bypass manually when the ATS is racked-out.

1. Unlike when using the "Testing the ATS," the doors must be closed and latched for the Bypass Manually to function. The Bypass Manually switches live power (S1 or S2) and caution should be used.
2. When in Bypass and with the ATS racked-out (ATS Isolated light will be illuminated), switch the Test-Manual Switch to the "Manual Bypass Sources". The manual operation of the Bypass unit will result in the controller being inactive in controlling the Bypass contactor. The Bypass/ATS light will now be flashing showing that the ATC is inactive (Figure 23).
3. If an ATC-800 is used, the manual switch will not switch to the other power source if there is no power on that source. If an ATC-300 is used, the manual switch will switch to the other power source even if there is no power on that source

   The controller is in Monitor Mode with the ATC-300 when the Switch is in the "Manual Bypass Sources."

   To select the source use the Manual Source Select switch. This switch is spring loaded to center. Switching to S1 or S2 will close the Bypass contactor to the desired source. The "Bypass Source 1 or Source 2" lights will be illuminated as the "Manual Select Switch" is used (see Figure 24). If no light is on, the contactor is in the tripped (open) position. If closed is desired, turn the switch longer. There is a 1 second interval for tripping and the closing of the contactor. This allows for testing and visual inspection of the unit tripping and closing.
4. To operate the Bypass contactor with the controller active, turn the Test-Manual Switch to "Off". The Bypass switching device is now back in automatic operation and the controller will close the appropriate side of the switch (S1 or S2). Turning this switch to the "Manual Bypass" position and back to "Off" will also reset the Controller (ATC-300 or ATC-800). This is a feature for resetting the controller with the doors closed and latched.

⚠ WARNING

HIGH VOLTAGE ASSOCIATED WITH OPERATIONAL TRANSFER SWITCH EQUIPMENT PRESENT A SHOCK HAZARD THAT CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT.

IN ADDITION, IMPROPER OPERATION OF THE GENERATOR SET PRESENTS A HAZARD THAT CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. OBSERVE ALL SAFETY PRECAUTIONS IN YOUR GENERATOR SET OPERATIONS AND INSTALLATION MANUALS.

5.5.3 Manual Operation

⚠ WARNING

DO NOT ATTEMPT TO MANUALLY OPERATE THE ATS WITH THE SWITCH IN THE CONNECTED POSITION. ENSURE THE DEVICE IS IN THE "TEST" POSITION WITH S1 AND S2 DEENERGIZED (TRIPPED-OPEN POSITION). FAILURE TO HEED THIS WARNING COULD RESULT IN DEATH OR SEVERE INJURY. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT.

To manually operate.

1. With the ATS drawn-out and the ATS Isolated light illuminated, one can manually switch the ATS contactor.
2. TO TRIP: Depress the “trip” button located on the operating mechanism of the contactor to bring the contactor to neutral (trip) position. Figure 27 shows the manual trip location on the mechanism.
3. TO CLOSE ON S1: Locate the manual lever on the left side of the contactor as shown in Figure 28.
4. Attach the handle to the manual lever.
5. Rotate the lever up to go to Source 1.
6. Depress the “trip” button located on the operating mechanism of the contactor to bring the contactor to neutral (trip) position.
7. TO CLOSE S2: Depress the “select” button located on the operating mechanism of the controller and rotate the lever up keeping the “select” button depressed to go to Source 2. This procedure is shown in Figure 29
8. Once the manual operation is complete and automatic operation is desired, trip the contactor, close and latch doors, and rack-in.
9. Follow the operation procedure in Section 5 to ensure proper automatic operation.

Note: Closing the contactor to S1 or S2 will require the lever to be pushed up. The only difference when going to S2 is also pushing in the select button..

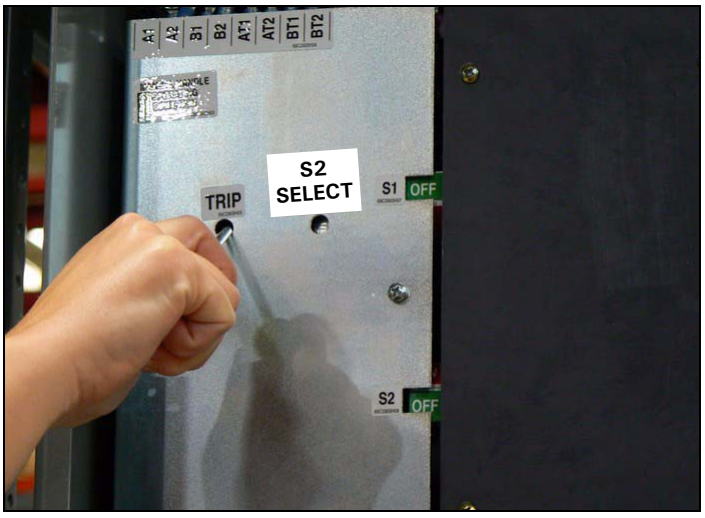


Figure 27. Manual Trip Location on the Mechanism.

Figure 28. ATS Manual Operating Handle in Use.

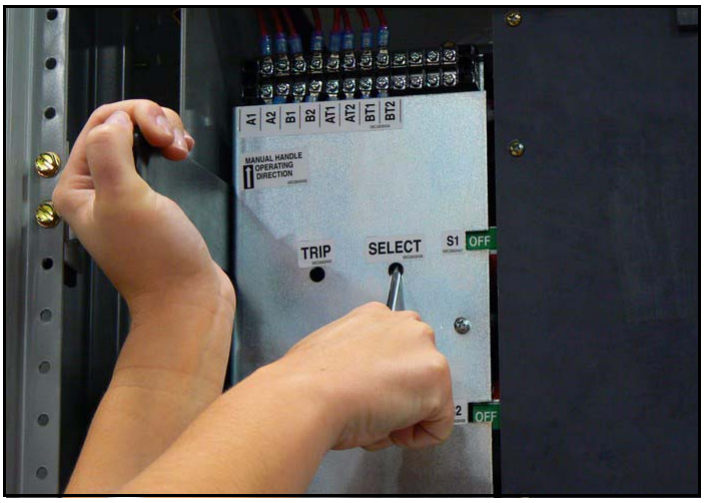


Figure 29. Procedure To Close S2.

Section 6: Draw-out, Racking-in, and Removal of the ATS Contactor

6.1 Installing a Draw-out (ATS) Switching Device

The Bypass Isolation Switch is equipped with two draw-out contactor switching devices. The bottom contactor (ATS) is interlocked and removable as shown in Figure 30. The Bypass contactor is identical (for interchangeability) to the ATS contactor. The Bypass unit can be disconnected but all power will be disconnected if the Bypass is racked out. S1 and S2 power must be removed. The bypass contactor will trip (got to neutral) if racking out occurs.

Figure 30. ATS Contactor Device Drawn-out from the Transfer Switch.

The truck rolls on internal rails as shown in Figure 31.

⚠ CAUTION

THE ATS (BOTTOM CONTACTOR) IS THE ONLY CONTACTOR OF THE TWO THAT CAN BE WITHDRAWN WHILE POWER IS ON WHEN THE SWITCH IS IN THE BYPASS MODE. THE BYPASS CONTACTOR DEVICE CAN ONLY BE REMOVED WHEN THERE IS NO POWER ON THE S1 OR S2 SOURCES.

⚠ CAUTION

IT IS IMPORTANT TO TAKE GREAT CARE WHEN PLACING A DRAW-OUT CONTACTOR DEVICE INTO THE INTERNAL RAILS. IF THE DEVICE IS NOT PROPERLY SEATED INTO THE RAILS, IT COULD FALL OUT FROM THE RAILS CAUSING EQUIPMENT DAMAGE AND/OR BODILY INJURY.

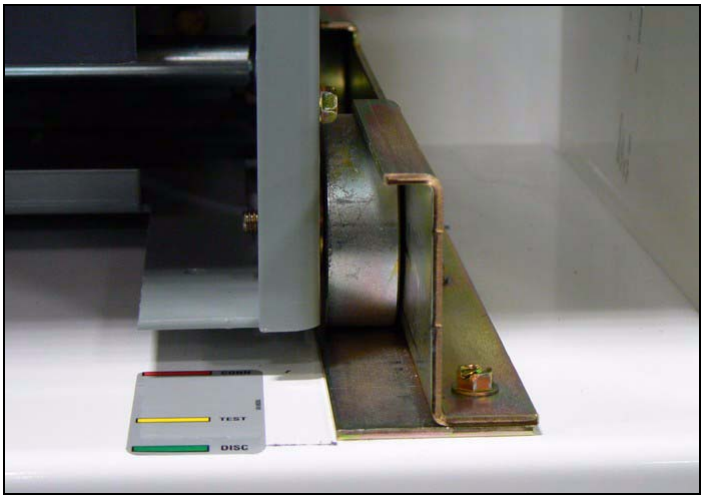


Figure 31. Internal Rails that Support the Wheels of the Truck Assembly.

⚠ CAUTION

THE TOP DOOR OF THE SWITCH SHOULD REMAIN CLOSED AT ALL TIMES. BEFORE INSTALLING THE ATS CONTACTOR, THE SWITCH MUST BE IN THE BYPASS MODE WITH THE POWER THROUGH THE BYPASS CONTACTOR.

To install the contactor, check the truck to be sure the unit is fully opened. Using a 3/8 inch square drive and ratchet with extension, which is not provided, make sure that the unit is in it's most counterclockwise position, but not enough that the wheels do not turn freely. The top door of the switch should remain closed at all times. Before installing the ATS contactor, the switch must be in the Bypass mode with the power through the Bypass contactor. With appropriate lifting devices, carefully insert (roll-in) the contactor into the rails of the cell as shown in Figure 31. Once all four wheels are fully inserted, the lifting mechanism can be removed as shown in Figure 32.

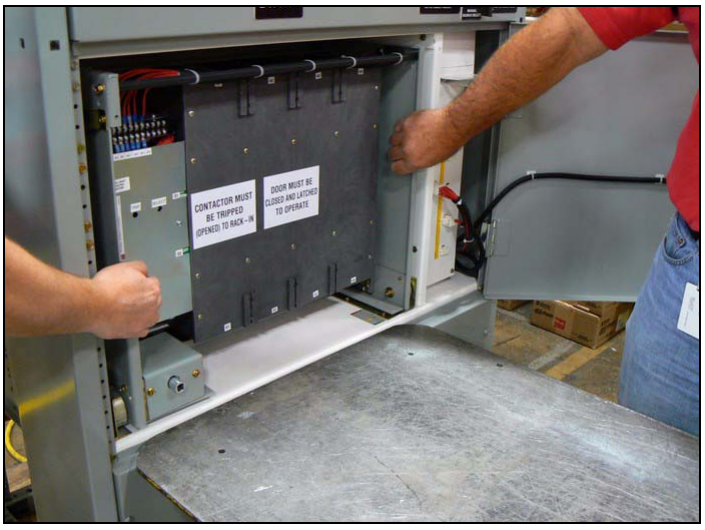


Figure 32. Removing the Lifting Mechanism.

⚠ CAUTION

IT IS IMPORTANT TO TAKE GREAT CARE WHEN PLACING A DRAW-OUT SWITCHING DEVICE INTO OR OUT OF THE ASSEMBLY. WHEN REMOVING THE CONTACTOR, THE STABS THAT CONTAIN THE S1, S2, AND LOAD POWER ARE ACCESSIBLE IN THE REAR OF THE CELL AND MAY BE ENERGIZED. GREAT CARE SHOULD BE TAKEN TO AVOID CONTACT AS AN ARC FLASH AND A SHOCK HAZARD EXISTS. FAILURE TO FOLLOW THIS WARNING COULD LEAD TO DEATH OR SERIOUS INJURY. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT.

6.2 To RACK-IN ATS Contactor

⚠ CAUTION

TO RACK-IN, THE CONTACTOR DEVICE MUST BE IN THE TRIPPED (OPEN) POSITION, THE UNIT MUST BE IN THE BYPASS MODE WITH THE POWER THROUGH THE BYPASS CONTACTOR, AND ALL DOORS CLOSED AND LATCHED.

Close and latch bottom ATS door. The Bypass top door is already closed and latched. Using a 3/8-inch square drive ratchet with extension, which is not provided, insert into the latch hole through door and turn clockwise. If the latch door is not opened, remove the key from top door by turning the key counterclockwise and insert it in the bottom door slot and turn to open latch opening. When the unit is switched to Bypass mode, the key is now retainable for one (1) minute. If the key is not removed within one(1) minute, simply go back to Auto and then slowly back to the Bypass mode. Continue levering the contactor into its different positions using a clockwise ratcheting motion (Figure 33). The "ATS Isolated" light will go off as shown in Figure 34. These lights are also on the top door and are redundant. Continue until the "ATS Locked" light comes on. Unit is now fully racked in on the stabs. Do not exceed 25 ft lb (33.9 Nm) of torque or the levering mechanism may be damaged. Return the key to the Bypass door and turn clockwise. The Kirk-Key must be returned and turned clockwise in the upper lock after closing the draw-out opening or the unit will not go back to the Auto mode. The unit can now be put in the Auto position if desired, (see Section 5 "Operation of the Bypass Isolation Switch").

Figure 33. Levering the Contactor into its Different Positions Using a Clockwise Ratcheting Motion.

6.3 To DRAW-OUT ATS Contactor (Isolate)

⚠ CAUTION

TO DRAW-OUT, THE CONTACTOR DEVICE MUST BE IN THE TRIPPED (OPEN) POSITION, THE UNIT MUST BE IN THE BYPASS MODE WITH THE POWER THROUGH THE BYPASS CONTACTOR, AND ALL DOORS CLOSED AND LATCHED.

Place the switch in its Bypass position (see Section 5 -"Operation of the Bypass Isolation Switch"). After confirming that the "Transfer to Bypass" light is on, turn the key counterclockwise and remove it. Insert the key in the bottom door slot and turn it to open the latch. When the unit is switched to Bypass mode, the key is now retainable for one (1) minute. If the key is not removed within one (1) minute, simply go back to Auto and then slowly back to the Bypass mode. Using a 3/8-in. square drive and ratchet with extension, which is not provided, insert the extension into latch hole through door and turn counter clockwise (see Figure 33). Continue levering the contactor into its different positions using a counterclockwise ratcheting motion. The "ATS Locked" light will go off. Continue until the "ATS Isolated" light comes on (see Figure 34). The unit is now fully isolated. The unit is still connected (secondary connector) to the control for testing but not connected to the S1 or S2 source power. The unit can now be tested (see Section 5 "Test-Manual Switch Operation.".

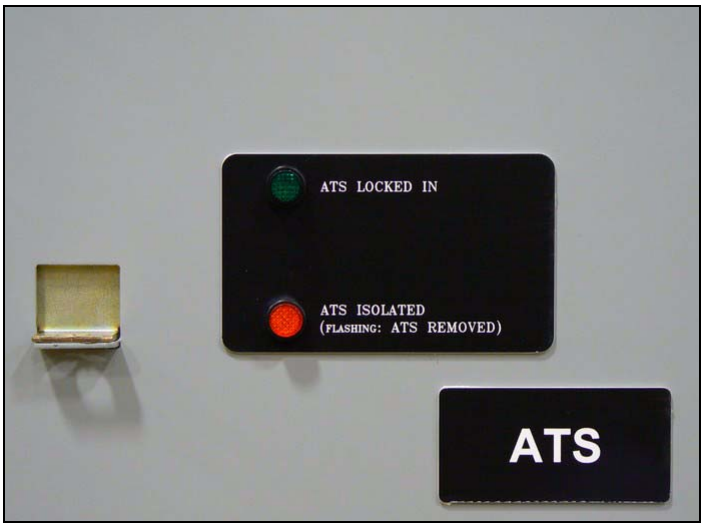


Figure 34. Rack-in Lights.

If levering continues, the unit will be removed from the secondary connector and ready for removal when the levering reaches a hard stop. When the contactor is removed from the secondary contactor, the "ATS Isolated" light will start to flash.

⚠ CAUTION

WHEN THE UNIT HAS REACHED IT'S DISCONNECT POSITION, IT IS READY TO BE REMOVED. THE UNIT IS ON WHEELS AND PULLING THE UNIT OUT WITHOUT THE CORRECT LIFT COULD RESULT IN SERIOUS INJURY OR DAMAGE TO THE UNIT. THE CONTACTOR IS NOT SECURED IN THIS STATE AND REPRESENTS A FALLING HAZARD WITHOUT THE APPROPRIATE LIFT PLATFORM.

Do not exceed 25 ft lb (33.9 Nm) of torque or the levering mechanism may be damaged. There will be a hard stop when disconnected, do not turn the ratchet any more. To open the door, insert a straight tool into the hole, lift up, and turn latch. This is demonstrated in Figure 35. If contactor removal is required, using an appropriate lifting devices, carefully pull out (roll-out) the contactor from the rails of the cell as shown in Figure 36.

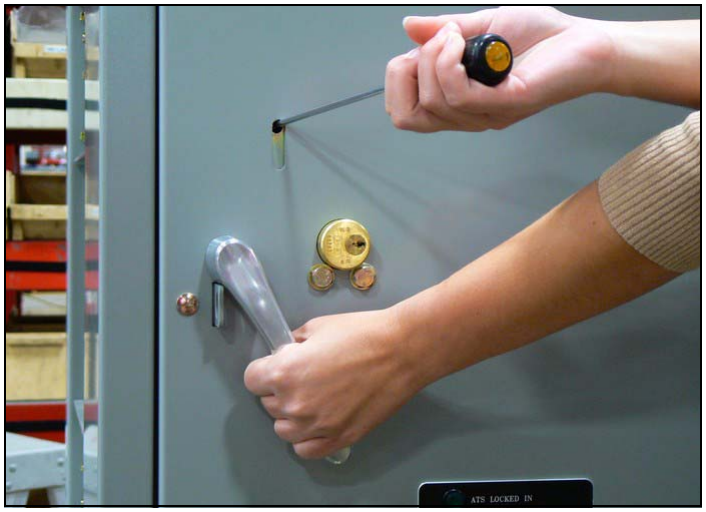


Figure 35. Opening the Door.

Figure 36. Contactor Rolled Out from the Rails of the Cell.

Figures 37 through 39 shows the sticker near the rail for a manual reference when racking the contactor in or out. The manual reference is used on for the Bypass unit as power is disconnected when that unit is to be drawn-out. The ATS has the door closed for racking-in or drawn-out so the reference is not visible.

The "Connect" area of the sticker is where the contactor is Locked In. The green light (ATS Locked In light) will illuminate on the top and bottom door. The "Test" area of the sticker is where the contactor is removed from the stabs (S1 or S2 and load) but the secondary or control connector is still connected. The ATS Isolated light will be illuminated. The "Disconnect" area of the sticker is where the secondary connector is not connected and the unit is ready to be removed from the cell. The ATS Isolated light will be flashing.

⚠ WARNING

IT IS IMPORTANT TO TAKE GREAT CARE WHEN PLACING A DRAW-OUT SWITCHING DEVICE INTO OR OUT OF THE SWITCH. WHEN REMOVING THE CONTACTOR, THE STABS THAT CONTAIN THE S1, S2, AND LOAD POWER ARE REACHABLE IN THE REAR OF THE CELL. TOUCHING THE STABS WITH ANYTHING CAN CAUSE BODILY INJURY OR DEATH.

⚠ CAUTION

IT IS IMPORTANT TO TAKE GREAT CARE WHEN REMOVING A DRAW-OUT CONTACTOR DEVICE. IF THE DEVICE IS NOT PROPERLY SEATED ON THE APPROPRIATE LIFTING DEVICE, IT COULD FALL CAUSING EQUIPMENT DAMAGE AND/OR BODILY INJURY.

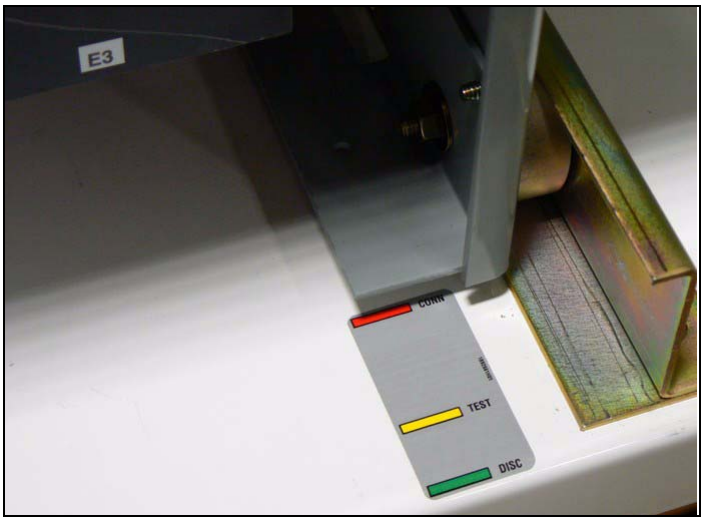


Figure 37. Switching Device in the LOCKED IN (CONNECT) Position.

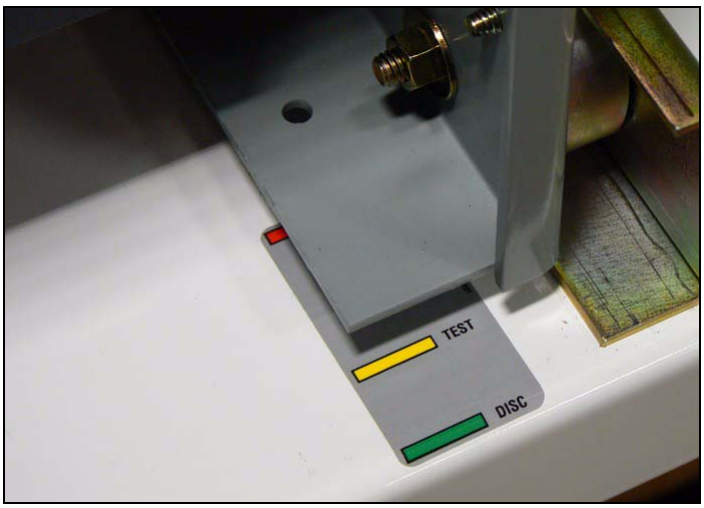


Figure 38. Switching Device in the ATS ISOLATED (TEST) Position.

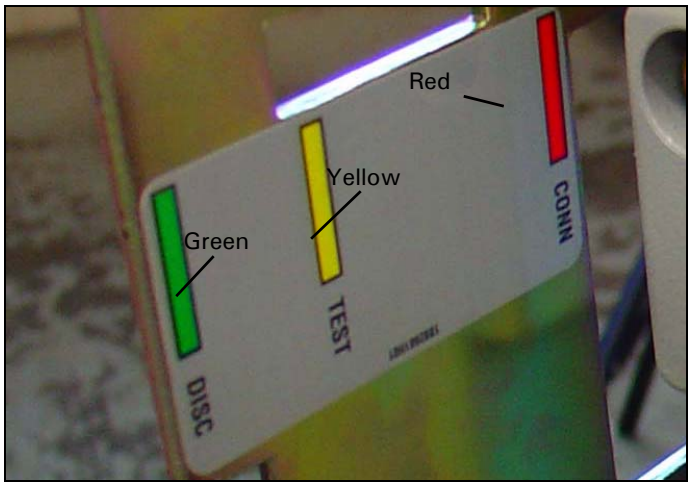


Figure 39.Label Showing DISCONNECT, TEST, and CONNECT Positions of the Contactor.

6.4 Draw-out, Racking-in, and Removal of Bypass Contactor

⚠ CAUTION

THE ATS (BOTTOM CONTACTOR) IS THE ONLY CONTACTOR OF THE TWO THAT CAN BE WITHDRAWN WHILE POWER IS ON WHEN THE SWITCH IS IN THE BYPASS MODE. THE BYPASS CONTACTOR DEVICE CAN ONLY BE REMOVED WHEN THERE IS NO POWER ON THE S1 OR S2 SOURCES.

To rack-in or draw-out the Bypass contactor, all power to the unit (S1 and S2) must be removed. Unlike the ATS unit, the Bypass has no lights, or latch features so power MUST be removed. The two contactors are the same and interchangeable. The top cell has a trip interlock to make sure the Bypass contactor is in the neutral position when racking out.

6.4.1 Installing a Bypass Switching Device

The Bypass Isolation Switch is equipped with a draw-out contactor switching device.

After power is removed, insert a tool into the bottom door and pull up to release the door lever as shown in Figure 40. Turn the door latch to open the bottom ATS door. After the bottom door is opened, the top Bypass door can now be opened.

⚠ CAUTION

IT IS IMPORTANT TO TAKE GREAT CARE WHEN PLACING A DRAW-OUT CONTACTOR DEVICE INTO THE INTERNAL RAILS. IF THE DEVICE IS NOT PROPERLY SEATED INTO THE RAILS, IT COULD FALL OUT FROM THE RAILS CAUSING EQUIPMENT DAMAGE AND/OR BODILY INJURY.

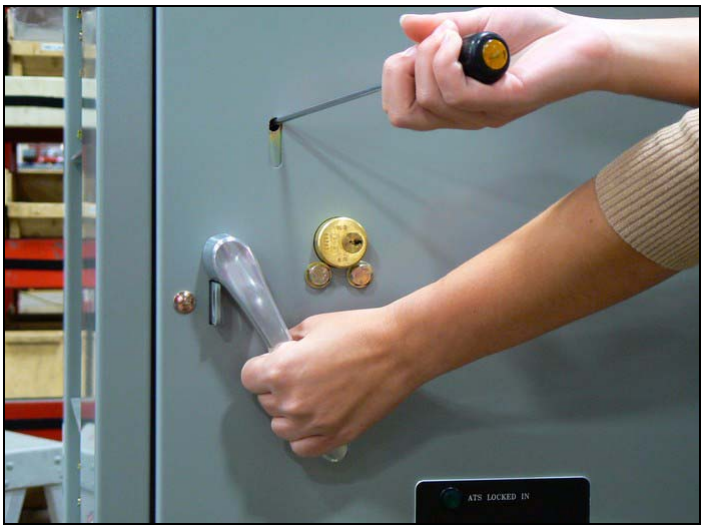


Figure 40. One must open the bottom door fist and then the Top door can be opened.

Check the truck mechanism to be sure the unit is fully levered opened. Using a 3/8 in. square drive and ratchet with extension, which is not provided, make sure that the unit is in it's most counterclockwise (fully levered) position. Using an appropriate lifting device, carefully insert (roll-in) the contactor into the rails of the cell as shown in Figure 43. Once all four wheels are fully inserted, the lifting device can be removed (see Figure 42).

The doors must remain closed and latched. The door has the manual Bypass and is only to be used when the contactor position will not change when initiated.

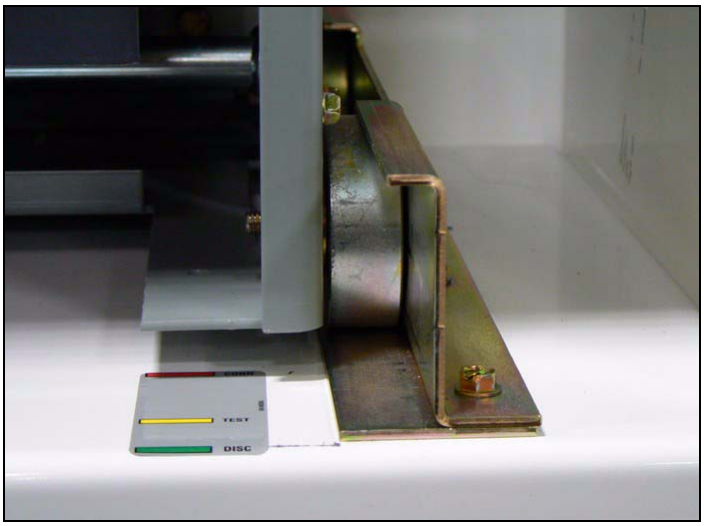


Figure 41. Insert (Roll-in) the Contactor into the Internal Rails of the Cell.

Figure 42. All Four Wheels are Fully Inserted and Lifting Device is Removed.

6.4.2 To RACK-IN Bypass Contactor

⚠ WARNING

TO RACK-IN, THE BYPASS CONTACTOR DEVICE MUST BE IN THE TRIPPED (OPEN) POSITION AND ALL POWER REMOVED FROM S1 AND S2. FAILURE TO FOLLOW THIS WARNING COULD LEAD TO DEATH OR SEVERE INJURY. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT ON EQUIPMENT BEFORE INSERTING CONTACTORS. DO NOT ATTEMPT TO INSTALL CONTACTORS OR PERFORM MAINTENANCE ON EQUIPMENT WHILE IT IS ENERGIZED. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT.

After power is removed, insert a tool into the bottom door and pull up to release the door lever. Turn the door lever to open the bottom ATS door. After the bottom door is opened, the top Bypass door can now be opened. Using a 3/8-in. square drive and ratchet with extension, which is not provided, insert the extension into drive hole and turn clockwise as shown in Figure 43. Continue levering the contactor into its position using a clockwise ratcheting motion. Since there are no lights to verify position, refer to the sticker showing the positions. (see Figures 37 through 39). When the unit is in the correct racked-in position according to the label, slowly continue to lever clockwise until a hard stop is reached. The unit is now fully in. Do not exceed 25 ft lb (33.9 Nm) of torque or the levering mechanism may be damaged. After closing and latching both doors, the power can now be reinstated to the switch and normal operation can commence (see Section 5 -"Operation of the Bypass Isolation Switch").

Figure 43. Clockwise Ratcheting Motion.

6.4.3 To DRAW-OUT the Bypass Contactor (Isolate)

After power is removed, insert a tool into the bottom door and pull up to release the door lever. Turn the door lever to open the bottom ATS door. After the bottom door is opened, the top Bypass door can now be opened. Using a 3/8-in. square drive and ratchet with extension, which is not provided, insert the extension into drive hole and turn counter clockwise. Continue levering the contactor into its different positions using a counterclockwise ratcheting motion. Since there are no lights to verify position, refer to the sticker showing the positions in Figures 37-39. When the unit is in the correct draw-out position according to the sticker, slowly continue to lever clockwise until a hard stop is reached. The unit is now fully isolated. If removal is required, using an appropriate lifting device, carefully pull out (roll-out) the contactor from the rails of the cell as shown in Figure 44.

Figure 44. Contactor Rolled-out from the Rails of the Cell.

⚠ CAUTION

IT IS IMPORTANT TO TAKE GREAT CARE WHEN REMOVING A DRAW-OUT CONTACTOR DEVICE. IF THE DEVICE IS NOT PROPERLY SEATED ON THE APPROPRIATE LIFTING DEVICE, IT COULD FALL CAUSING EQUIPMENT DAMAGE AND/OR BODILY INJURY.

Section 7: Testing and Problem Solving

7.1 Operation With Door Closed

Many times the door is not closed and latched. The door light is flashing. The door must be closed and latched to operate in the following modes. The Kirk-Key must also be in the door and the key turned fully clockwise for the unit to "start up" in the AUTO position.

1. Automatic mode using the ATS Contactor.
2. To perform the Bypass operation (Auto to Bypass).
3. To perform the Auto operation from Bypass (Bypass to Auto).
4. The Kirk-key will not be released unless the unit is in Bypass and the doors are closed and latched. The unit must be in Bypass which means that the amber "Transfer to Bypass" light is on. The Kirk-Key will release and the light will come on when the ATS is tripped and the Bypass contactor is close on source 1 or 2.
5. To manually change the Bypass sources with the "Manual Bypass Switch" and the "Manual Source Select Switch."
6. The Kirk-Key must be returned and turned clockwise in the upper lock after closing the draw-out opening or the unit will not go back to the Auto mode.

The Door and Latch is an extra safety feature of the Bypass Isolation Switch. The ATS bottom door is only opened when the ATS contactor has been drawn-out and is ready to be tested, removed, or installed. The Bypass top door never needs to be opened unless power is removed from S1 and S2. Turning the "Test-Manual" switch switch to the "Manual Bypass" position and back to "Off" will also reset the Controller (ATC-300 or ATC-800). This reset function allows the controller to be reset with the doors closed.

7.1.1 Closed Transition Connections

Option 47 is for Closed Transition. If that option is ordered, the unit will arrive from the factory with the Closed Transition provided. There is the ability to make the unit into an open transition if desired by following these simple steps.

Closed to Open Transition

1. Configure ATC-800 Controller to OPEN Transition
2. Remove the jumper between TB8-1 and TB8-2

To go back to a Closed Transition Switch, simply reverse this procedure.

7.2 Lights

Simple light tests can be performed on the controller by pushing in the lamp test push button. All other lamps can be tested using the lamp test push button switch on the option panel. All lamps should light when being tested. The "Locked In" and "Auto" lamps will stay on for approximately 30 seconds after the switch is released. This is normal operation. When the unit is in the Auto position all lamps will be off except for those on the ATC-300 or 800. When switching to Auto from Bypass, the AUTO and ATS LOCKED IN lights will remain on for about 30 seconds.

7.3 Testing

After the ATS equipment is initially installed or during planned outages, the installation should be tested to ensure that all equipment operates properly. This attention to detail will help avoid unexpected malfunctions. Mechanical and/or electrical tests should be performed as described in this section.

The frequency of subsequent testing should be based on recommendations of the Genset manufacturer.

⚠ WARNING

HIGH VOLTAGE ASSOCIATED WITH OPERATIONAL TRANSFER SWITCH EQUIPMENT PRESENT A SHOCK HAZARD THAT CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT.

IN ADDITION, IMPROPER OPERATION OF THE GENERATOR SET PRESENTS A HAZARD THAT CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. OBSERVE ALL SAFETY PRECAUTIONS IN YOUR GENERATOR SET OPERATIONS AND INSTALLATION MANUALS.

7.3.1 Mechanical and/or Electrical Testing

NOTICE

SINCE FEATURE 4 (TIME DELAY ENGINE COOL-OFF) IS A STANDARD FEATURE, AN ENGINE START SIGNAL WILL BE PRESENT FOR A PERIOD OF TIME WHEN THE SWITCH IS FIRST ENERGIZED. THE PERIOD OF TIME IS EQUAL TO THE TIMER SETTING. TO AVOID STARTING THE ENGINE DURING THIS TIME PERIOD, TURN THE GENERATOR CONTROLS TO THE OFF POSITION.

Energize the ATS equipment as described in Sections 6.1.2 through 6.1.6. Insure that all safety precautions are taken and that all **WARNINGS** and **CAUTIONS** are observed.

7.3.2 No Voltage Steps

With no voltage available on either power source, proceed as follows.

Step 1: The generator engine start controls should be in the OFF position to prevent an undesired start.

Step 2: Ensure that the ATS has been set to the proper applied system voltage (See Section 3.3).

Step 3: Check all ATS loads to ensure that they are ready to be energized.

7.3.3 Connecting the Power Sources

Step 1: Close the Source 1 power source upstream protection device.

Step 2: Connect the engine start battery cable.

Step 3: With the emergency generator in the OFF position, close the Source 2 power source upstream protective device, assuming such a device used.

NOTICE

AT THIS POINT, AND PRIOR TO MAKING ANY ATTEMPT TO ENERGIZE THE ATS EQUIPMENT, THE ENGINE-DRIVEN GENERATOR SHOULD BE OPERATED. IF NECESSARY, THE VOLTAGE REGULATOR ON THE GENERATOR SHOULD BE ADJUSTED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. THE ATS EQUIPMENT WILL RESPOND ONLY TO THE RATED VOLTAGE AND FREQUENCY PROGRAMMED INTO THE CONTROLLER.

Step 4: Close any generator engine-start controls opened as a result of actions taken in Step 1, the switch.

Step 5: Where required, use an accurate voltmeter to check phase-to-phase and phase-to-neutral voltages present at the transfer switch Source 1, Source 2, and/or load terminals.

7.3.4 Operational Checks

Step 1: Check to ensure that Source 1 switching device is in the CLOSED position. This should have been done in Section 6.1.3, Step 1.

Step 2: Initiate an automatic transfer operation from the Source 1 to the Source 2 power source by pressing the **<Engine Test>** pushbutton two times.

Note: The ATC-300 Logic Controller provides the capability to set the Engine Test function to:

0. No Load Engine Test;
1. Load Engine Test; or
2. Disabled.

The factory default is set to:

1. Load Engine Test
   - **a.** After the Time Delay Engine Starting (TDES) has timed out, the engine should start, run, and build up to normal voltage and frequency.
   - **b.** The transfer switch will transfer to the Source 2 power source after the Time Delay Normal to Emergency (TDNE) times out.

Step 3: Initiate an automatic transfer operation back to the Source 1 power source by pressing the **<Engine Test>** pushbutton one time.

1. After the Time Delay Emergency to Normal timer (TDEN) has timed out, the transfer switch will transfer back to the Source 1 power source.
2. The Time Delay for Engine Cool-Off (TDEC - Feature 4) will allow the engine to run unloaded for a preset time after transfer to the Source 1 power source is completed.

7.3.5 Alternate Tests

1. Alternate operational tests may be possible depending upon the options provided with any given ATS. Refer to the schematic diagram provided with the ATS equipment, along with the specification nameplate, to determine the exact options provided.

⚠ WARNING

DO NOT ATTEMPT TO MANUALLY OPERATE THE SWITCH WITH THE SOURCE 1 POWER SOURCE CONNECTED AND AVAILABLE.

DO NOT ATTEMPT TO MANUALLY OPERATE THE SWITCH WITH THE SOURCE 2 POWER SOURCE CONNECTED AND AVAILABLE.

FAILURE TO FOLLOW THIS WARNING COULD RESULT IN DEATH OR SEVERE INJURY. MOVE CONTACTORS TO "TEST" POSITION AND ENSURE NO VOLTAGE IS ON EQUIPMENT PRIOR TO OPERATING MANUALLY. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT.

7.4 Problem Solving

⚠ WARNING

HAZARDOUS VOLTAGE IN AND AROUND ATS EQUIPMENT DURING THE TROUBLE SHOOTING PROCESS CAN CAUSE SEVERE PERSONAL INJURY AND/OR DEATH. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT.

⚠ WARNING

ONLY PROPERLY TRAINED PERSONNEL, FAMILIAR WITH THE ATS EQUIPMENT AND ITS ASSOCIATED EQUIPMENT, SHOULD BE PERMITTED TO PERFORM THE TROUBLE SHOOTING FUNCTION. IF AN INDIVIDUAL IS NOT QUALIFIED TO PERFORM THE TROUBLE SHOOTING, THE INDIVIDUAL SHOULD NOT ATTEMPT ANY OF THESE PROCEDURES. NEVER ATTEMPT TO SERVICE OR PERFORM MAINTENANCE ON EQUIPMENT WHILE ENERGIZED. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT ON EQUIPMENT BEFORE SERVICING OR INSPECTING. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. CONSULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING, INSPECTING OR OPERATING EQUIPMENT.

A basic problem-solving effort is the first step to take prior to calling for assistance. Frequently, the effort will successfully address most problems encountered. The problem solving procedure is presented in the Troubleshooting Guide. Remember, only qualified individuals familiar with the ATS equipment and the system in which it is applied should attempt these problem solving procedures.

If a problem persists after having completed the problem solving procedure, contact a Eaton representative for further assistance. When calling for assistance, the following is the minimum information required to properly address the need:

1. Style number of ATS, if applicable;
2. Catalog number of ATS;
3. Actual location of the ATS (type of facility, address, etc.);
4. Company name and name and position of individual representing company;
5. Basic description of the situation as it exists; and
6. Any results of the problem solving steps taken and/or readings taken.

Section 8: Adjustments

8.1 General

Refer to I.B. 01602009E, supplied with the ATS for ATC-300 Controller adjustments and programming.

Refer to the I.B. ATS-C103, supplied with the ATS for ATC-800 Controller. There is no adjustments required within the switch unit.

Section 9: Maintenance

9.1 Introduction

⚠ WARNING

HIGH VOLTAGE ARE PRESENT IN AND AROUND ATS EQUIPMENT. BEFORE INSPECTING OR MAINTAINING THIS EQUIPMENT, DISCONNECT THE LINE POWER FROM, THEN LOCK OUT, IF POSSIBLE, THE UPSTREAM DISCONNECT DEVICE. FAILURE TO FOLLOW THIS PROCEDURE COULD CAUSE SEVERE PERSONAL INJURY AND/OR DEATH. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT ON THE EQUIPMENT PRIOR TO INSPECTING OR SERVICING. WHILE ENERGIZED, AN ARC FLASH AND SHOCK HAZARD EXISTS. COSNULT NFPA 70E AND OSHA GUIDELINES FOR OPERATOR SAFETY PRIOR TO SERVICING OR OPERATING EQUIPMENT.

In general, ATS switch equipment is designed to be relatively maintenance free under normal usage. However, because of the variability of application conditions and the importance placed on dependable operation by this type of equipment, inspection and maintenance checks should be made on a regularly scheduled basis. Since equipment maintenance will consist mainly of keeping the equipment clean, the frequency of maintenance will depend to a large extent on the cleanliness of the equipment's surroundings. If a significant amount of dust or foreign matter is present, a more frequent maintenance schedule should be followed.

It is suggested that visual inspections of the equipment be made on a regular basis, not just during scheduled periods. Always be alert for an accumulation of dirt in and around the structure; loose parts; and/or hardware, cracks, and/or discoloration to insulation; and damaged or discolored components.

9.2 Procedures

A suggested maintenance procedure is outlined in Table 5.

Table 5. Periodic Maintenance Procedures.

STEP	ACTION
A. Make the ATS equipment safe for inspection and/or maintenance.	Disconnect the line power from the equipment being serviced by opening the next highest disconnect device. Make certain that any accessory control power is switched off by disconnecting all control plugs.
B. Inspect the structure area for safety hazards or potential maintenance problems.	Inspect the area, especially where the switching device is installed, for any safety hazards, including personnel safety and fire hazards. Exposure to certain chemical vapors can cause deterioration of electrical connections.
	Inspect for accumulated dirt, loose hardware, or physical damage.
	Examine the primary insulation for evidence of cracking or overheating. Overheating will show as discoloration, melting, or blistering of conductor insulation, or as pitting or melting of the conductor surfaces due to arcing.
	Inspect the secondary control connections for damage and the control wiring for insulation integrity.
C. Inspect the power contactor for dust, dirt, soot, grease, moisture, or corrosion.	Remove dust, dirt, soot, grease, moisture, and corrosion contamination from the surface of the switching device using a dry soft lint-free cloth, dry soft bristle brush, and vacuum cleaner. Do not blow debris into the power contactor. If contamination is found, look for the source and fix the problem.
D Check for material integrity, uneven wear, discoloration, or loose hardware.	Severe material cracking will require replacement and loose hardware will need to be tightened.
E. Check the terminals and connectors for looseness or signs of overheating.	Overheating will show as discoloration, melting, or blistering of the conductor insulation.
	Connections that do not have signs of looseness or overheating should not be disturbed.
F. Exercise the power contactor if it is not often exercised while in operation. This will permit a "wiping" action by the contacts.	If the power contactor is used for frequent switching during normal operation, this step can be disregarded.
G. Return the ATS equipment to service.	Make certain all barriers are in place and the doors closed and latched. Reapply the secondary and primary power.

9.3 Removal of Enclosure Covers

If required to remove the enclosure covers a 3/8 socket will be required. The back and two sides are similar in that if the lower panels need to be removed, the top panel must be removed first.

⚠ WARNING

IT IS IMPORTANT THAT THE SAME BOLTS BE USED FOR THE REAR PANELS AS THEY ARE SHORTER THEN THE SIDES AND FRONT.

In order to remove the front panels, top and lower, the two doors must be opened on the unit. Open the bottom door first by inserting a tool in the hole, pulling up and turning the lever (Figure 35).

Section 10: Renewal Parts Guide

10.1General

Refer to Figure 45 for assistance with selecting and ordering selected ATS renewal parts.

Example: To order the transformer panel for an **ATC3C3X31200XRU** transfer switch, order Catalog Number **68C8241G02** as shown in Figure 45.

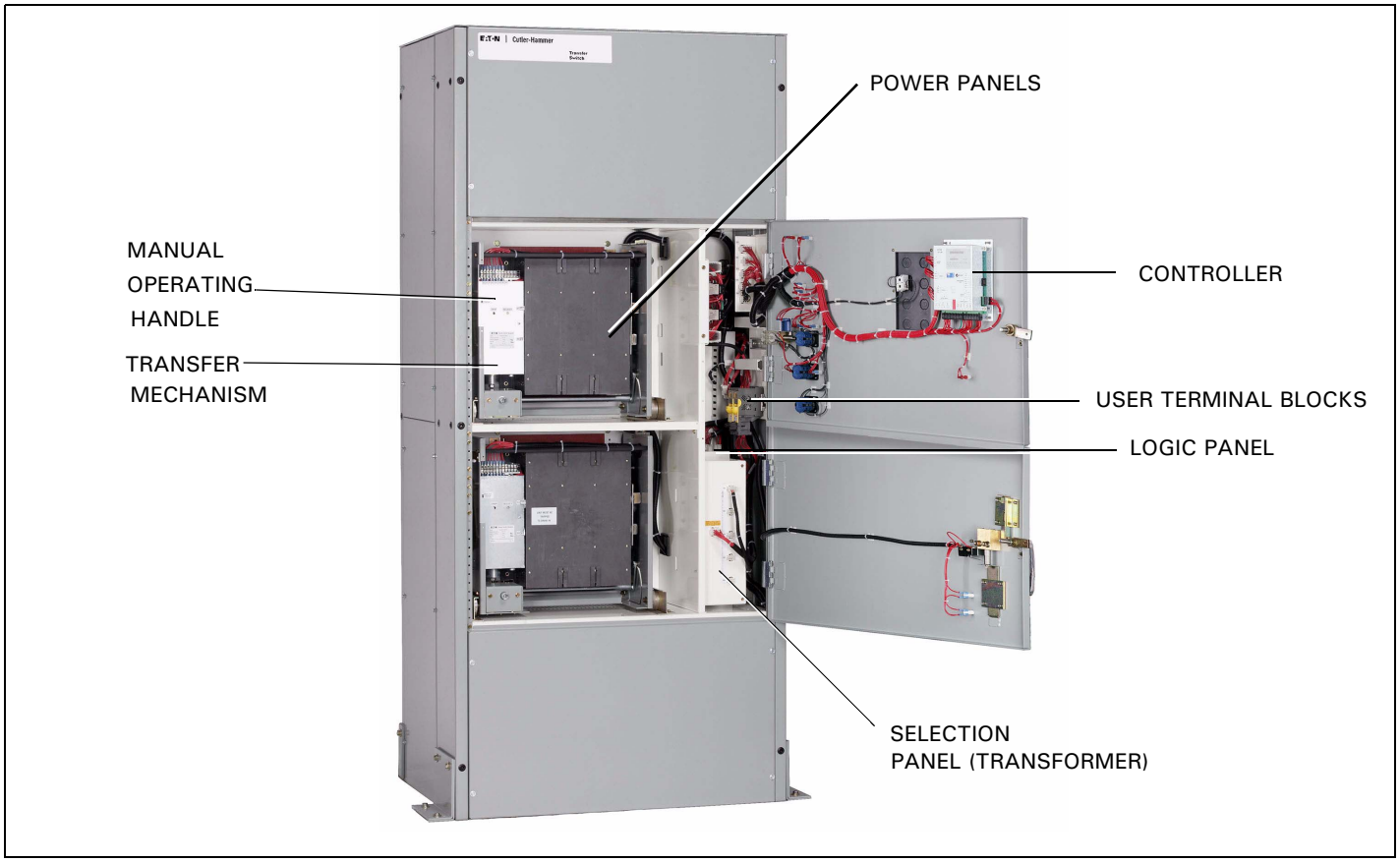


Figure 45.1200A, 3-Pole, ATS Interior Components.

Replacement Parts List

FUNCTION / DEVICE	PART NUMBER	QTY. PER SWITCH	DESCRIPTION
ATC-300 Controller - 3 Position Contactor Type (TDN)	CAT#8160A00G28		
ATC-800 Controller - Contactor Type ATS	CAT#8160A00G43		
Transformer Pack	68C8241G01		
Contactor in Truck Assembly 3 pole, 3 position 4 pole, 3 position	 68C8259G01 68C8259G02	 2 2	
100W space heater	8160A41G55	1	
375W space heater	8160A41G63	1	
TRANFORMER ASSEMBLY			
D-FRM XFMR BOX ASSY(480V)	68C8241G03	1	
WIRE HARNESS ASSEMBLIES			
BYPASS ISOL DOOR HRNSS ATC-800	67B8489G01	1	
BYPASS ISO RELAY CNTR PNL	67B8489G02	1	
BYPASS ISOL LOGIC CONTROLS	67B8489G03	1	
BYPASS ISOL (ATS) CONTACTOR 1	67B8489G04	1	
BYPASS ISO(BYPASS) CONTACTOR 2	67B8489G05	1	
CONTACTOR 1 (ATS) - INTER CONN	67B8489G06	1	

Table 6. Replacement Parts List (Continued)

FUNCTION / DEVICE	PART NUMBER	QTY. PER SWITCH	DESCRIPTION
CONTACTOR 2 (BYPASS) - INTER C	67B8489G07	1	
BYPASS MAIN INTER CONN ATC-800	67B8489G08	1	
BYPASS LIMIT SWITCH/INDICATION	67B8489G09	1	
BYPASS ISOLATION DOOR HARNESS	67B8489G10	1	
BYPASS ISOL DOOR HRNSS ATC-300	67B8489G11	1	
BYPASS MAIN INTER CONN ATC-300	67B8489G12	1	
CONTROLLER			
ATC-300 FINAL ASSEMBLY - OPEN TRANSITION	CAT#8160A00G28	1	
ATC-800 FINAL ASSEMBLY - OPEN / CLOSED TRANSITION	CAT#8160A00G43	1	
CONTROL RELAYS			
RELAY ASSEMBLY, 2POLE, 120VAC	67A2579G02	2	
C-H, D9 POWER RELAY, 120VAC, 2	D9PR10BA	1	
4PST NO POWER RELAY 120 VAC	D9PR8BA	6	
LINE REPLACEABLE UNITS			
ENCLOSURE DOOR (UPPER/BYPASS)			
ATS BYPASS ISOLATION DOOR ASSY - ATC-800	69D8020G01	1	
ATS BYPASS ISOLATION DOOR ASSY - ATC-300	69D8020G02	1	
RELAY PANEL			
ATS BYPASS ISOLATION RELAY PNL	69D8021G01	1	
LOGIC PANEL			
ATS BYPASS ISOLATION LOGIC	69D8022G01	1	
OPTION PANEL			
BYPASS ISOLATION OPTION PNL	69D8023G01	1	
FINAL ASSEMBLY			
BYPASS ISO FINAL ASSY ATC-800	69D8024G01	1	
BYPASS ISO FINAL ASSY ATC-300	69D8024G02	1	
ENCLOSURE DOOR (LOWER/ATS)			
BYPASS ISOLATION LWR DOOR ASSY	69D8025G01	1	
COMPONENTS			
2 Position Switch, Double Throw, w handle	CA11 A221*USC001E	1	
3 Position, spring loaded, w handle	CA11 A215*USC001E	1	
3 Position Switch, w handle	CA11 USM861*03E	1	
RED LIGHT	3050-4-13-38310	3	
GREEN LIGHT	3050-4-13-38340	7	
AMBER LIGHT	3050-4-13-38320	4	
D-FRAME MICRO SWITCH	66B5249H01	5	
LIMIT SWITCH	E47BMS42	1	
Terminal Lugs	AB-750-4	Depending on System	
OPTIONAL FEATURES			
NORMAL SOURCE AVAILABLE			
OPT 14G SOURCE 1 RELAY AT_3	8160A14G53		
RELAY ASSEMBLY, 2POLE, 120VAC	67A2579G02	1	
RELAY SOCKET, 2P, SH2B-05,IDEC	1229C25H01	1	
RELAY #RH2B-U 120VAC	1229C24H01	1	
IDEC CLIP CAT#SFA-202	66A8058H01	2	
EMERGENCY SOURCE AVAILABLE			
OPT 14H SOURCE 2 RELAY AT_3	8160A14G54		
RELAY ASSEMBLY, 2POLE, 120VAC	67A2579G02	1	
RELAY SOCKET, 2P, SH2B-05,IDEC	1229C25H01	1	
RELAY #RH2B-U 120VAC	1229C24H01	1	
IDEC CLIP CAT#SFA-202	66A8058H01	2	

Section11: ATC-300 Controlled ATS Quick Start Instructions

WARNING

THESE QUICK START INSTRUCTIONS ARE NOT A COMPLETE SOURCE OF INFORMATION ON THE ATC-300 CONTROLLED ATS EQUIPMENT. INSTALLATION SHOULD NOT BE STARTED UNTIL THE ENTIRE INSTRUCTION BOOK HAS BEEN REVIEWED AND UNDERSTOOD. FAILURE TO FOLLOW THE FULL INSTRUCTIONS CAN RESULT IN DEATH, SEVERE PERSONAL INJURY, OR PROPERTY DAMAGE.

WARNING

THESE QUICK START INSTRUCTIONS ARE PROVIDED FOR USE ONLY BY TECHNICIANS HIGHLY FAMILIAR AND EXPERIENCED WITH ATC-300 CONTROLLED ATS EQUIPMENT INSTALLATION, SET UP, AND TESTING. IT IS STRONGLY SUGGESTED THAT THE FULL INSTRUCTIONS BE FOLLOWED FOR ALL INSTALLATIONS, SET UP, AND TESTING.

Step 1: Mount the ATS on a flat rigid surface. Shim if necessary.

Step 2: Install the power cables. Cables must be sized and installed per National Electrical Code, refer to NFPA70. The cables must be sized within the specified cable size range on the side of the cable connectors.

Connect the cables and torque to the correct value (For type AB-750-4 terminal lugs, the torque value is 550 in/lbs) indicated on the label on the door in the following order:

1.Load Cables* (T1, T2, T3);

2.Source 1 or Utility Supply (N1, N2, N3); and

3.Source 2 or Generator Supply (E1, E2, E3).

For 4 pole transfer switches, connect the load cables (TN), Source 1 or utility supply (NN), and Source 2 or generator supply (EN). Refer to Figure 48 for the location of all parts discussed in this document. Figure 17 also shows the bus configurations for a three pole system.

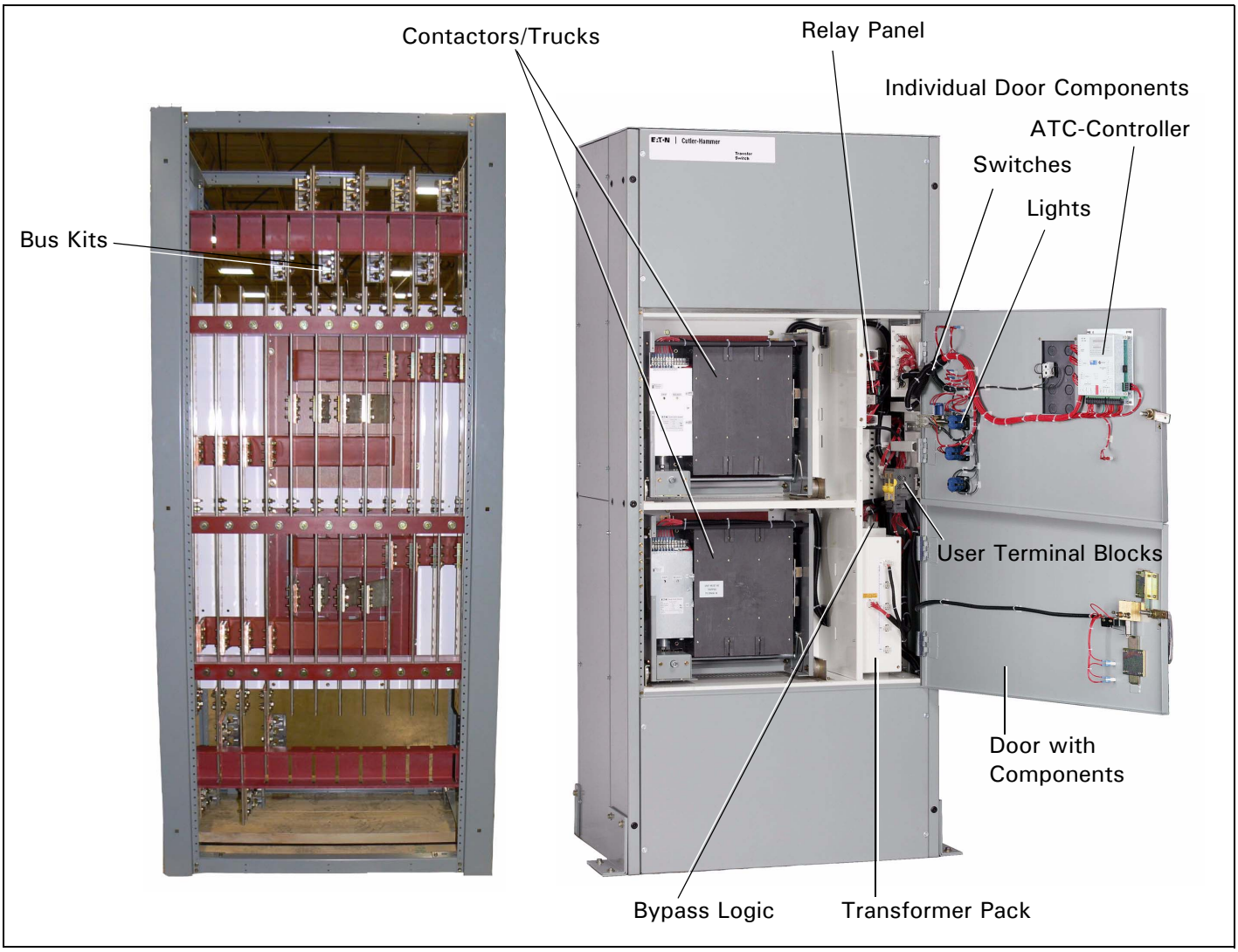


Figure 46. Typical ATC-300 Controlled 1200A ATS.

Step 3: Turn the generator OFF at the generator control panel. This will prevent unexpected activation of the generator.

Step 4: Connect the Engine Generator Start wires to terminals 13 and 14 on the J-5 connector on the ATC-300 Controller (Figure 49). This contact is CLOSED whenever the engine generator is needed, and should be connected to a generator controller. **NEVER** connect directly to a starter solenoid or ignition system. See the Genset manufacturer instruction leaflet for recommended wire sizes and location procedures.

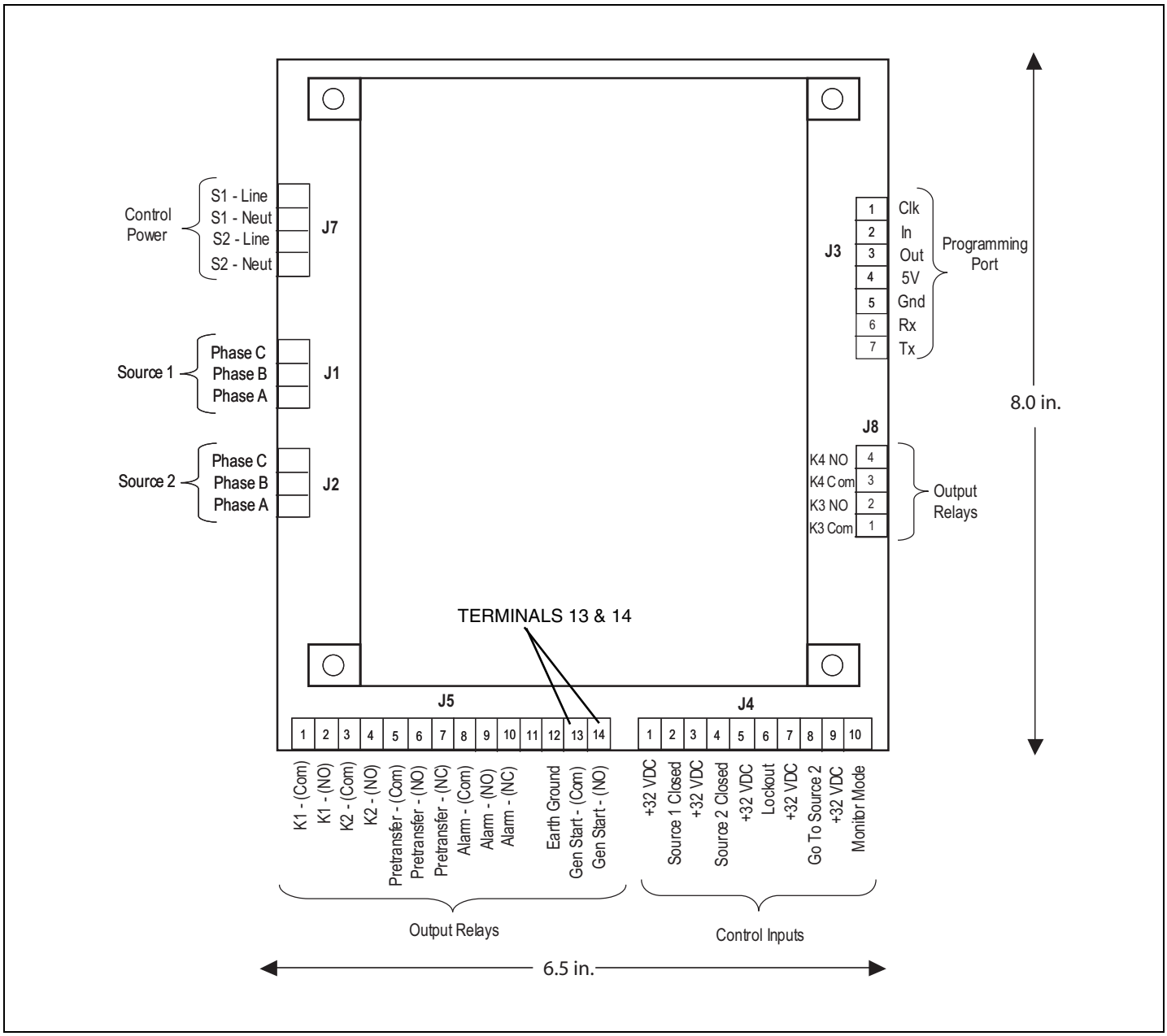


Figure 47. Engine Generator Control Connection.

Step 5: Apply Utility (Source 1) power. If the switch is properly applied for the system voltage ordered, the display should work and the Source 1 Available white LED should light (see Figure 48). Using a voltmeter, check for proper system voltage on Source 1 and load terminals. Check all phases on a 3-phase switch. Voltage measurements should be taken phase to phase and phase to neutral.

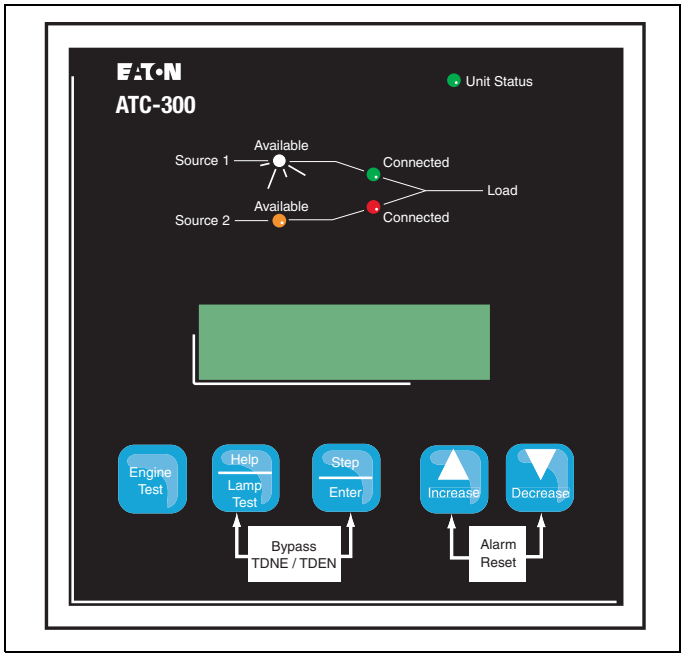


Figure 48. ATC-300 Logic (Utility Supplying Load).

Step 6: To view the setpoints, press the <**Step/Enter**> pushbutton and enter the Password.

Note: The factory default Password is 0300. Once all installation and testing is complete, the Password should be changed by authorized personnel to a unique Password for the equipment.

After entering the password, press the <**Step/Enter**> pushbutton until the VIEW SETPOINTS menu appears. Select YES. Press the <**Step/Enter**> pushbutton to scroll through the setpoints (see Table 6).

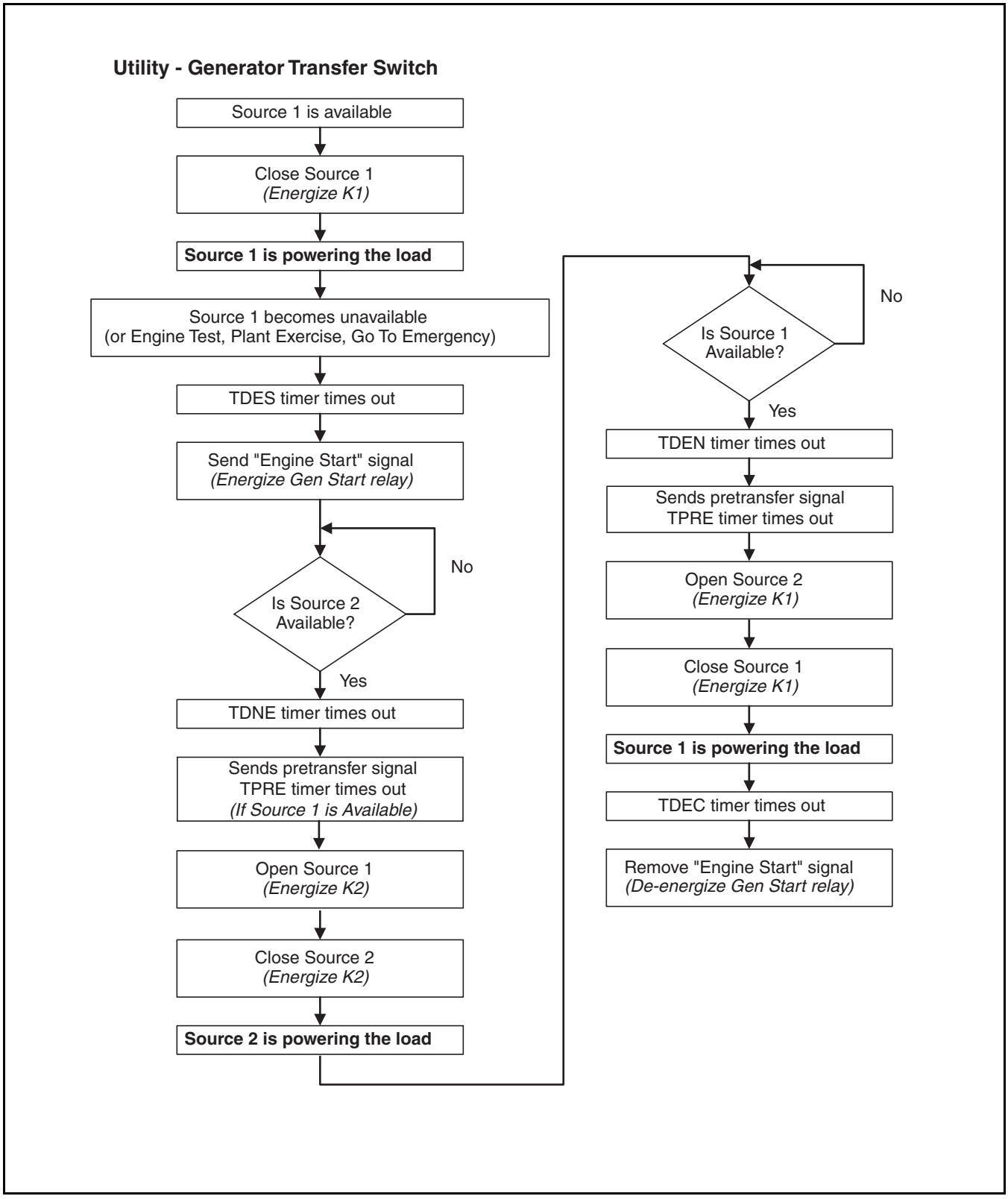


Figure 49. Utility - Generator Transfer Switch.

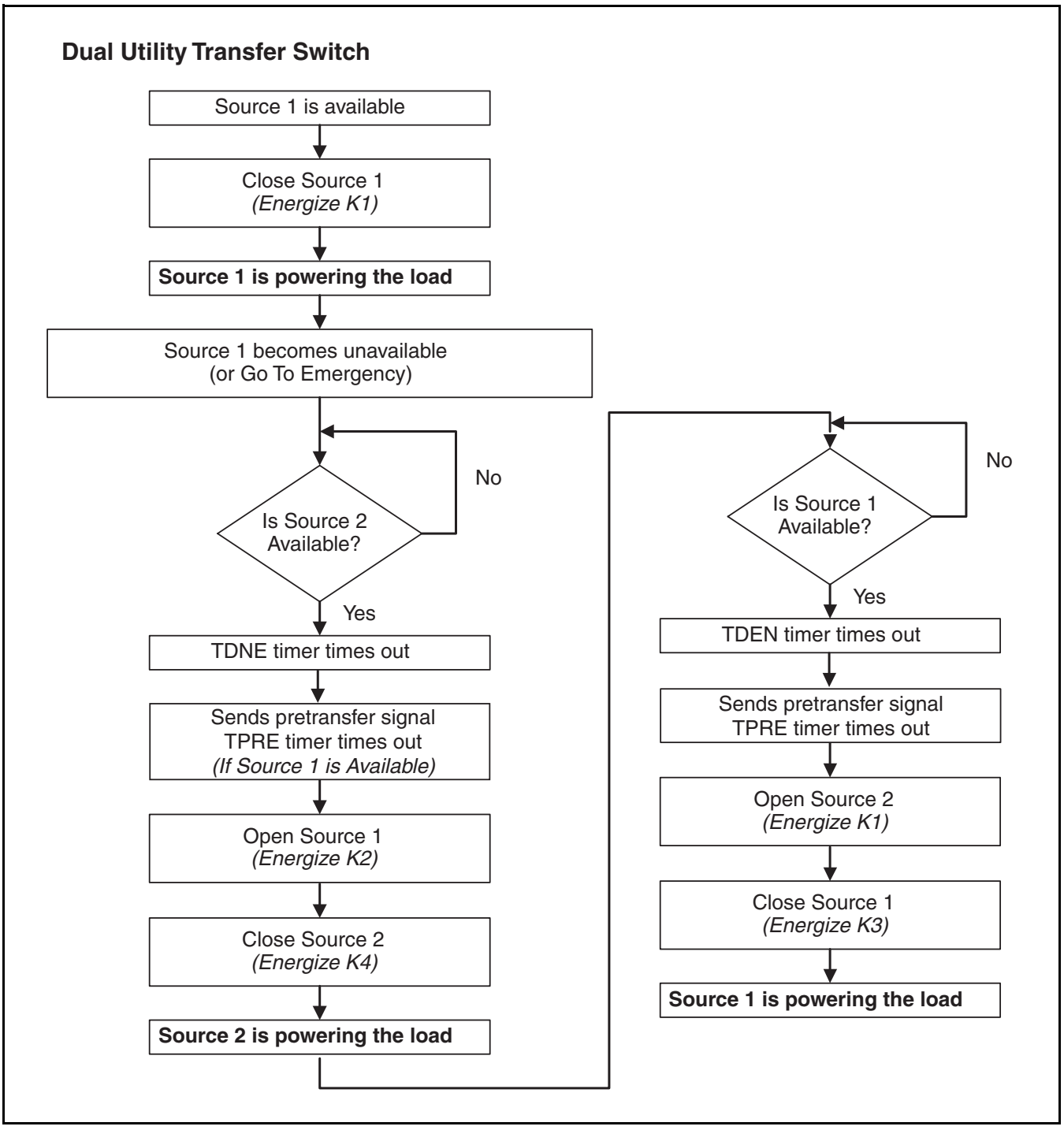


Figure 50. Dual Utility Transfer Switch.

Table 7. Setpoint Possibilities.

SETPOINT	SETPOINT UNITS	DESCRIPTION	RANGE	FACTORY DEFAULT
New Password	Four Digits	Set New Password	0000 to 9999	0300
TDES	Minutes: Seconds	Time Delay Engine Start	0 to 120 seconds	0:03
TDNE	Minutes: Seconds	Time Delay Normal to Emergency	0 to 1800 seconds	0:00
TDEN	Minutes: Seconds	Time Delay Emergency to Normal	0 to 1800 seconds	5:00
TDEC	Minutes: Seconds	Time Delay Engine Cool-off	0 to 1800 seconds	5:00
NOM FREQ	Hertz	Nominal Frequency	50 or 60 Hz	As ordered
NOM VOLTS	Volts	Nominal Voltage	120 to 600 volts	As ordered
S1 UV DROP	Volts	Source 1 Undervoltage Dropout Range: Contactor Style ATS (3-position)	78 to 97% of Nominal System Voltage	85%
S2 UV DROP	Volts	Source 2 Undervoltage Dropout Range: Contactor Style ATS (3-position)	78 to 97% of Nominal System Voltage	90%
S1 UV PICK	Volts	Source 1 Undervoltage Pickup Range: Contactor Style ATS (3-position)	(Dropout +2%) to 99% of Nominal System Voltage	92%
S2 UV PICK	Volts	Source 2 Undervoltage Pickup Range: Contactor Style ATS (3-position)	(Dropout +2%) to 99% of Nominal System Voltage	92%
S1 OV DROP	Volts	Source 1 Overvoltage Dropout Range: Contactor Style ATS (3-position)	105 to 110% of Nominal System Voltage	110%
S2 OV DROP	Volts	Source 2 Overvoltage Dropout Range: Contactor Style ATS (3-position)	105 to 110% of Nominal System Voltage	110%
S1 OV PICK	Volts	Source 1 Overvoltage Pickup Range: Contactor Style ATS (3-position)	103% to (Dropout -2%) of Nominal System Voltage	108%
S2 OV PICK	Volts	Source 2 Overvoltage Pickup Range: Contactor Style ATS (3-position)	103% to (Dropout -2%) of Nominal System Voltage	108%
S1 UF DROP	Hertz	Source 1 Underfrequency Dropout Range: Contactor Style ATS (3-position)	90 to 97% of Nominal System Frequency	95%
S2 UF DROP	Hertz	Source 2 Underfrequency Dropout Range: Contactor Style ATS (3-position)	90 to 97% of Nominal System Frequency	95%
S1 UF PICK	Hertz	Source 1 Underfrequency Pickup Range: Contactor Style ATS (3-position)	(Dropout +1 Hz) to 99% of Nominal System Frequency	97%
S2 UF PICK	Hertz	Source 2 Underfrequency Pickup Range: Contactor Style ATS (3-position)	(Dropout +1 Hz) to 99% of Nominal System Frequency	97%
S1 OF DROP	Hertz	Source 1 Overfrequency Dropout Range: Contactor Style ATS (3-position)	103 to 105% of Nominal System Frequency	105%
S2 OF DROP	Hertz	Source 2 Overfrequency Dropout Range: Contactor Style ATS (3-position)	103 to 105% of Nominal System Frequency	105%
S1 OF PICK	Hertz	Source 1 Overfrequency Pickup Range: Contactor Style ATS (3-position)	101% to (Dropout -1 Hz) of Nominal System Frequency	103%
S2 OF PICK	Hertz	Source 2 Overfrequency Pickup Range: Contactor Style ATS (3-position)	101% to (Dropout -1 Hz) of Nominal System Frequency	103%
TDN	Minutes: Seconds	Time Delay Neutral	0 to 120 seconds	0:00
PLANT EXER	Days	Plant Exerciser Programming	OFF, DAILY, 7-DAY, 14-DAY or 28 DAY	OFF
PE LOAD XFR		Plant Exerciser Load Transfer	0 or 1 (1 = yes)	0
PE DAY	Days	Plant Exerciser Day of the Week	1 SUN, 2 MON, 3 TUE, 4 WED, 5 THU, 6 FRI or 7 SAT	

Table 6. Setpoint Possibilities (cont').

SETPOINT	SETPOINT UNITS	DESCRIPTION	RANGE	FACTORY DEFAULT
PE HOUR	Hours	Plant Exerciser Hour	0 to 23	0
PE MINUTE	Minutes	Plant Exerciser Minute	0 to 59	0
TEST MODE		Test Mode	0, 1 or 2 (0 = No Load Engine Test, 1 = Load Engine Test, 2 = Disabled)	0
TER	Hours: Minutes	Engine run test time	0 min to 600 min	5:00
TPRE	Minutes: Seconds	Pretransfer delay timer	0 sec to 120 sec	0:00
PHASES		Three phase or single phase	1 or 3	AS ORDERED
VOLT UNBAL	Volts	Voltage Unbalanced	0 or 1 (1 = Enabled)	1
UNBAL DROP %	Percent	Percent for Unbalanced Voltage Dropout	5 to 20% of Phase to Phase Voltage Unbalance	20%
UNBAL PICK %	Percent	Percent for Unbalanced Voltage Pickup	Dropout minus (UNBAL DROP % -2) to 3%	10%
UNBAL DELAY	Seconds	Unbalanced Delay Timer	10 to 30	0:20
TDEF	Seconds	Time Delay Emergency Fail Timer	0 sec to 6 sec	6
PHASE REV		Phase Reversal	OFF, ABC, or CBA	OFF
DST ADJUST		Day Light Savings	0 or 1 (1=Enabled)	1
LANGUAGE		Selected Language	English, French, or Spanish	English
CHANGE TIME/DATE?		Set Time and Date		
	Hours	Set Hour	0 to 23	Eastern Standard Time
	MINUTES	Set Minute	0 to 59	Eastern Standard Time
	WEEKDAY	Set Weekday	SUN, MON, TUE, WED, THU, FRI or SAT	Eastern Standard Time
	MONTH	Set Month	JAN or 01	Eastern Standard Time
	DAY	Set Day	1 to 31	Eastern Standard Time
	YEAR	Set Year	Current Year	Eastern Standard Time
RESET SYSTEM COUNTERS?			Yes or No	No
RESET ALL?		Resets all System Counters	Yes or No	No
RESET ENGINE RUN?	Hours	Resets ENGINE RUN Counter	0 to 9999	XXXX
RESET S1 CONN	Hours	Resets S1 CONN Counter	0 to 9999	XXXX
RESET S2 CONN	Hours	Resets S2 CONN Counter	0 to 9999	XXXX
RESET S1 AVAIL	Hours	Resets S1 AVAIL Counter	0 to 9999	XXXX
RESET S2 AVAIL	Hours	Resets S2 AVAIL Counter	0 to 9999	XXXX
RESET LOAD ENERG	Hours	Resets LOAD ENERG Counter	0 to 9999	XXXX
RESET TRANSFERS	Hours	Resets TRANSFERS Counter	0 to 9999	XXXX
SAVE SETPOINTS?		Save Changed Setpoints	Yes or No	Yes

See the tables in the Appendix for Voltage and Frequency Pickup and Dropout settings.

Step 7: To change or add a setpoint, select **Yes** when the "Change Setpoints" message appears on the screen. Use the <**Step/Enter**> pushbutton to step through the setpoints.

Use the <**Increase**> and <**Decrease**> pushbuttons to change the setpoint.

When finished scrolling through and changing the desired setpoints, answer **Yes** when the "Save Setpoints?" question appears on the screen. The display will return to the default screen.

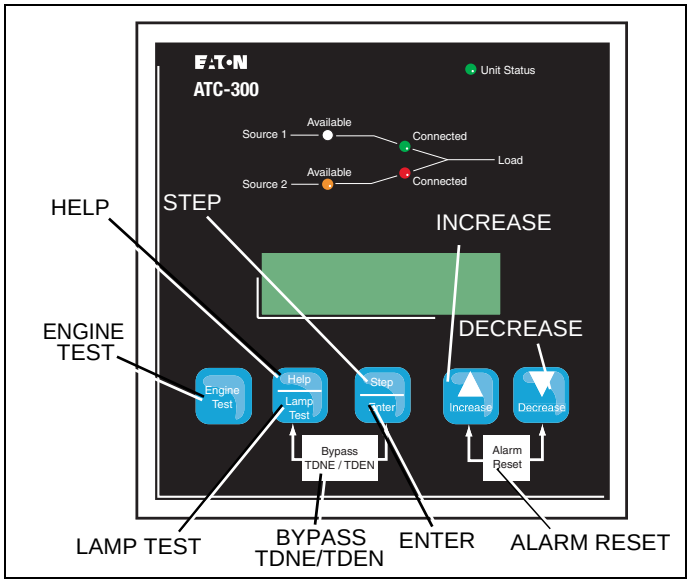


Figure 51. ATC-300 Pushbuttons.

WARNING

THE GENERATOR SHOULD BE MANUALLY STARTED AND THE OUTPUT CHECKED AND VERIFIED BEFORE PROCEEDING TO STEP 8. IF IMPROPER VOLTAGE/FREQUENCY IS APPLIED TO THE LOAD, THE ATS MAY BE DAMAGED.

Step 8: Manually start the engine generator at the generator controller. Check that the generator is running and the *Source 2 Available* amber LED is lit. Press the <**Step/Enter**> pushbutton, step through the phase voltages, frequency, and message display. If the source message indicates that the source is Good, shut down the generator and place the Genset controller in the Auto-operating position. If the message indicates a problem with the source, the setpoints should be reviewed and the generator checked for proper voltage and frequency output.

Step 9: Initiate a Load Test from the front panel of the ATC-300 (see Figure 52). This may be done by setting the engine test setpoint to:

1 Load Test

then saving the setpoints. Once the engine test setpoint has been changed and saved, press the <**Engine Test**> pushbutton twice. The generator should start, the ATS should transfer and run on the generator for the set test interval, then proceed to a TDEN countdown and return to Source 1. While the ATS is connected to Source 2, use a voltmeter to check for correct system voltage on the load terminals of the ATS. Check all phases on a 3-phase system. Voltage measurements should be taken phase to phase and phase to neutral. A load test will cause a momentary power outage during transfer.

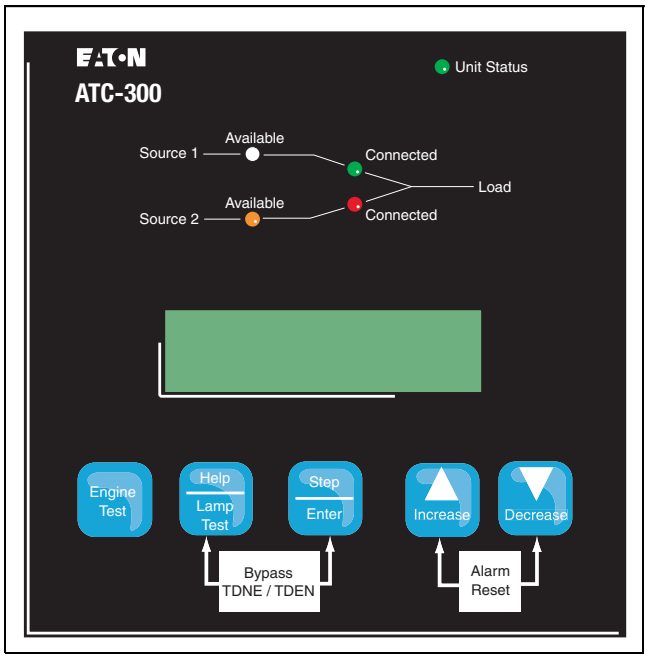


Figure 52. ATC-300 Logic.

Step 10: ATC3 Controlled ATS Power Failure Test - Initiate a Load Test by simulating an actual power failure.

1. This should be done by opening the upstream breaker or fused disconnect switch.
2. The generator should start and the ATS should transfer to Source 2.
3. After transfer, close the upstream breaker, or close the Source 1 Control Circuit Fused Disconnect. The TDEN timer should begin counting, and, when complete, the ATS should transfer to Source 1. The TDEC should time out and shut the Source 2 power unit down.

NOTICE

WHILE PERFORMING TESTING, IF AN UNDESIRED OR UNDOCUMENTED RESULT OCCURS, FIRST CONTACT THE LOCAL GENSET DEALER. IF THE RESULT IS NOT CORRECTED, CONTACT THE EATON POWER QUALITY TECHNICAL SUPPORT CENTER AT 1-800-354-2070.

Appendix A: Pickup / Dropout Tables

UNDERVOLTAGE PICKUP / DROPOUT TABLE

PERCENTAGE	VOLTAGE								
	120	208	220	240	380	415	480	600	
97	116	202	213	233	369	403	466	582	
96	115	200	211	230	365	398	461	576	
95	114	198	209	228	361	394	456	570	
94	113	196	207	226	357	390	451	564	
93	112	193	205	223	353	386	446	558	
92	110	191	202	221	350	382	442	552	
91	109	189	200	218	346	378	437	546	
90	108	187	198	216	342	374	432	540	Pickup
89	107	185	196	214	338	369	427	534	
88	106	183	194	211	334	365	422	528	
87	104	181	191	209	331	361	418	522	
86	103	179	189	206	327	357	413	516	
85	102	177	187	204	323	353	408	510	Dropout
84	101	175	185	202	319	349	403	504	
83	100	173	183	199	315	344	398	498	
82	98	171	180	197	312	340	394	492	
81	97	168	178	194	308	336	389	486	
80	96	166	176	192	304	332	384	480	
79	95	164	174	190	300	328	379	474	
78	94	162	172	187	296	324	374	468	
77	92	160	169	185	293	320	370	462	
76	91	158	167	182	289	315	365	456	
75	90	156	165	180	285	311	360	450	
74	89	154	163	178	281	307	355	444	
73	88	152	161	175	277	303	350	438	
72	86	150	158	173	274	299	346	432	
71	85	148	156	170	270	295	341	426	
70	84	146	154	168	266	291	336	420	
69	83	144	152	166	262	286	331	414	
68	82	141	150	163	258	282	326	408	
67	80	139	147	161	255	278	322	402	
66	79	137	145	158	251	274	317	396	
65	78	135	143	156	247	270	312	390	
64	77	133	141	154	243	266	307	384	
63	76	131	139	151	239	261	302	378	
62	74	129	136	149	236	257	298	372	
61	73	127	134	146	232	253	293	366	
60	72	125	132	144	228	249	288	360	
59	71	123	130	142	224	245	283	354	
58	70	121	128	139	220	241	278	348	
57	68	119	125	137	217	237	274	342	
56	67	116	123	134	213	232	269	336	
55	66	114	121	132	209	228	264	330	
54	65	112	119	130	205	224	259	324	
53	64	110	117	127	201	220	254	318	
52	62	108	114	125	198	216	250	312	
51	61	106	112	122	194	212	245	306	
50	60	104	110	120	190	208	240	300	

OVERVOLTAGE PICKUP / DROPOUT TABLE

PERCENTAGE	VOLTAGE								
	120	208	220	240	380	415	480	600	
120	144	250	264	288	456	498	576	720	
119	143	248	262	286	452	494	571	714	
118	142	245	260	283	448	490	566	708	
117	140	243	257	281	445	486	562	702	
116	139	241	255	278	441	481	557	696	
115	138	239	253	276	437	477	552	690	
114	137	237	251	274	433	473	547	684	
113	136	235	249	271	429	469	542	678	
112	134	233	246	269	426	465	538	672	
111	133	231	244	266	422	461	533	666	
110	132	229	242	264	418	457	528	660	Dropout
109	131	227	240	262	414	452	523	654	
108	130	225	238	259	410	448	518	648	
107	128	223	235	257	407	444	514	642	
106	127	220	233	254	403	440	509	636	
105	126	218	231	252	399	436	504	630	Pickup

UNDERFREQUENCY PICKUP / DROPOUT TABLE

PERCENTAGE	FREQUENCY		
	50	60	
97	49	58	
96	48	58	
95	48	57	Pickup
94	47	56	
93	47	56	
92	46	55	
91	46	55	
90	45	54	Dropout

OVERFREQUENCY PICKUP / DROPOUT TABLE

PERCENTAGE	FREQUENCY		
	50	60	
110	55	66	
109	55	65	
108	54	65	
107	54	64	
106	53	64	
105	53	63	Dropout
104	52	62	
103	52	62	
102	51	61	Pickup

Notes:

Notes:

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